Unemployment and wage adjustments in the Greek labour market: evidence from the pre and post 2009 periods

Daouli J., M. Demoussis, N. Giannakopoulos and I. Laliotis

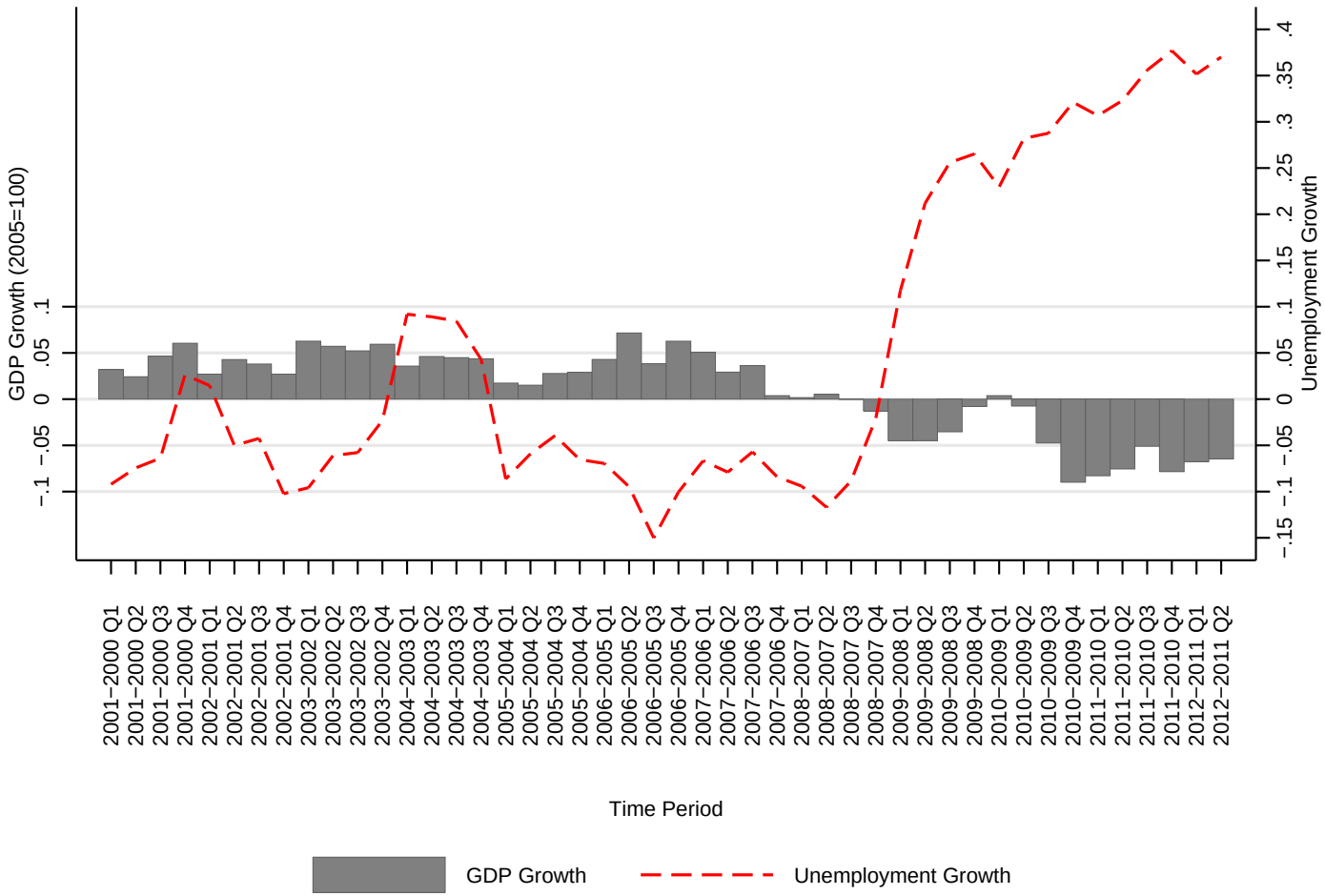
Department of Economics
University of Patras

Labour Economics Conference
The Greek Labour Market in the ongoing Crisis
Bank of Greece, Athens
November 27, 2012

Outline

Outline

GDP and Unemployment growth rates, period 2001q1-2012q2



Source: Hellenic Statistical Authority (EL.STAT)

What is the short-run response of wages to local labor market shocks?

What do we know?

- Blanchflower & Oswald (1994) introduced the concept of the *"wage curve"*: $\ln w_{irt} = a + b \ln U_{rt} + ...$, where w_{irt} is the real pay measure of individual i in region r at time t and U_{rt} stands for the contemporaneous local unemployment rate of region r at time t.
  - Sample of countries including the US and Britain: $\hat{b} = -0.10$ (Blanchflower & Oswald, 1994). The estimated coefficient implies that doubling the unemployment rate in a region will be accompanied by a drop of around 10 percent in the level of wages in that region holding everything else constant
  - Meta analysis of 208 elasticities (worldwide): $\hat{b} = -0.05$ (Nikjamp and Poot, 1995)
  - In Nordic countries: $\hat{b} = 0$ (Albæk *et al.*, 2000)
- Evidence from Greece:
  - Livanos (2010) based on nominal (!!!) pay measures (2000-2004:q2) concluded that there is a strong cross-sectional wage curve ($\hat{b} = -0.15$)

Decomposing regional unemployment rates

Table 1 : Summary statistics of permanent and transitory unemployment rates by region (NUTSII) and time period

	2001q1-2008q4					2009q1-2012q2				
	Permanent	Transitory				Permanent	Transitory			
Region	Mean	Median	SD	Min	Max	Mean	Median	SD	Min	Max
East Macedonia & Thrace	.104	-.004	.016	-.024	.035	.163	-.013	.048	-.063	.077
Central Macedonia	.104	.006	.013	-.024	.016	.159	-.014	.056	-.069	.091
West Macedonia	.152	.003	.020	-.032	.038	.188	-.027	.064	-.077	.113
Epirus	.110	-.001	.011	-.021	.020	.146	-.016	.038	-.036	.074
Thessaly	.102	-.002	.020	-.032	.038	.137	-.012	.044	-.057	.083
Ionian Islands	.102	-.011	.041	-.061	.088	.131	.009	.045	-.081	.068
West Greece	.103	-.003	.010	-.013	.027	.146	-.011	.053	-.056	.104
Central Greece	.110	-.010	.022	-.030	.049	.160	-.024	.059	-.059	.121
Attica	.090	-.001	.015	-.030	.039	.145	-.010	.054	-.065	.095
Peloponnese	.085	.004	.010	-.015	.014	.121	-.015	.041	-.041	.079
North Aegean	.080	-.001	.019	-.040	.029	.114	-.014	.055	-.064	.106
South Aegean	.105	-.015	.049	-.075	.114	.140	-.004	.042	-.069	.100
Crete	.071	-.001	.022	-.040	.059	.135	-.006	.050	-.075	.094
Greece	.096	.004	.012	-.026	.024	.146	-.016	.052	-.056	.094

Source: Quarterly Labour Force Survey, Hellenic Statistics Authority (EL.STAT)

Notes: Permanent unemployment corresponds to the period specific average unemployment rate. Transitory unemployment is the time-specific deviations from the permanent unemployment rate

Decomposing regional unemployment rates

- 2001q1-2008q4
  - Permanent regional unemployment differences do exist
  - The transitory component of regional unemployment appears to be a purely random variable (with median around zero)
  - Thus, we do not expect that it will be possible to identify a wage curve (there are permanent differences in regional unemployment rates but no evidence for different unemployment shocks between regions)
- 2009q1-2012q2
  - Permanent regional unemployment differences still exist but now they are more pronounced.
  - The transitory component of regional unemployment is no longer random (its median deviates from zero)
  - Thus, a wage curve could be identified (since there are permanent differences in unemployment rates and there is evidence for different unemployment shocks between regions)

Outline

Labour Laws and wage adjustments

What do we know?

- **Law 1876/1990**
  - Did not promote wage adjustments. This system of labour relations fostered only upward wage flexibility since negotiations at more decentralized levels are not allowed to worsen already attained outcomes. Thus, firm-level contracting is accompanied by wage premia (Daouli, Demoussis, Giannakopoulos and Laliotis, 2012)
- **Law 3899/2010**
  - Under decentralized bargaining, there is some room for wage adjustments (conditional on firm's financial situation). The contractual wage can not fall below the legal national minimum wage.
- **Law 4024/2011**
  - Under decentralized bargaining, wages adjust freely (no prerequisites). The contractual wage can not fall below the legal national minimum wage.

Why do Labour Laws matter?

. . . the specifics of the bargaining regime affect the slope of the wage curve

- Case 1. Wage curve exists (wages are sensitive to current labour market conditions): depending on the level of wage bargaining (national, regional firm) the wage curve is characterized by different unemployment elasticities.
  - Blien *et al.* (2011) found that, in Germany, the wage curve is more elastic under firm-level contracting.
- Case 2. Wage curve does not exist (wages are not sensitive to current labour market conditions): the institutional framework that governs collective bargaining may restrict wage responsiveness to local labour market conditions.
  - Albæk *et al.* (2000) provide a theoretical model, for Nordic countries, where central bargaining determines horizontal wage increments. In this case central bargaining takes into account only a specific national unemployment rate and ignores local labour market conditions.

Outline

Outline

Outline

Quarterly Labour Force Survey: QLFS

- Periods: $2003q1 - 2008q1$ and $2009q1 - 2012q1$
- The QLFS refers to individuals above 15 years old: around 68,000 individuals and 13,000 salary workers per quarter
- Use the EL.STAT definition of unemployment (based on international classification)
- Pay measure: Net Monthly Earnings (includes all additional payments). The QLFS pay measure is provided in income brackets (8 bands for 2003q1-2008q4 and 10 bands for 2009q1-2012q1). Mid-points of each income bracket were used. For hourly pay rate we divided monthly salary by usual monthly hours (usual weekly hours times 4.2 weeks per month)
- Regional information at NUTS-II level (13 administrative regions)

Structure of Earnings Survey: SES

- Years: 2002 and 2006
- Cross-sectional matched employer-employee datasets
- Workers in firms with more than 10 employees in sectors C-K of the NACE Rev. 1.1 nomenclature
- Individual characteristics: earnings, working hours, age, gender, tenure, education, occupation etc.
- Firm characteristics: number of employees, industry, operating region, type of collective agreement, ownership type
- Collective agreements: National, sectoral, firm level
- SES data merged with the regional unemployment rates at the NUTS-II level (QLFS, 2002 and 2006)

Administrative data on collective agreements: ADM

- Official contracts of the collective bargaining agreements at the firm level (Ministry of Labour, Social Security and Welfare)
- All signed agreements in the period 2010-2012 with effective coverage $2009m6 - 2012m8$
- Information: company name, company address, company's legal form, sign date, industry affiliation, applicable labour law, bargained wage outcome
- Bargained wage outcome: (a) direction of change over the previous wage (upward, downward, unchanged) (b) size of wage adjustment

Outline

Estimating the slope of the wage curve

- **Worker-level estimates**
  - Pooled
    $$\ln w_{irt} = \alpha + \beta \ln U_{rt} + \gamma X_{irt} + \epsilon_{irt} \quad (1)$$
  - Longitudinal
    $$\ln w_{irt} = \alpha + \beta \ln U_{rt} + \gamma X_{irt} + \nu_i + \epsilon_{irt} \quad (2)$$
- **Firm-level estimates**
  - Pooled
    $$\overline{\ln w}_{jrt} = \alpha + \beta \ln U_{rt} + \gamma \overline{X}_{jrt} + \epsilon_{jrt} \quad (3)$$
- **Region-level estimates**
  - Pooled
    $$\overline{\ln w}_{rt} = \alpha + \beta \ln U_{rt} + \gamma \overline{X}_{rt} + \epsilon_{rt} \quad (4)$$
  - Longitudinal
    $$\overline{\ln w}_{rt} = \alpha + \beta \ln U_{rt} + \gamma \overline{X}_{rt} + \nu_r + \epsilon_{rt} \quad (5)$$

Outline

Searching for the “wage curve"

Pooled cross-sectional estimates, QLFS

Table 2 : The impact of (ln) regional unemployment rates on (ln) pay measures in Greece (Pooled estimates)

Dependent variable:	Monthly salary		Hourly wage	
Model specifications	Nominal	Real	Nominal	Real
Panel A: 2003q1-2008q4				
Benchmark model	-.131[a]	-.011	-.120[a]	-.001
	(.028)	(.011)	(.029)	(.012)
	[.384]	[.383]	[.472]	[.475]
Plus time dummies	-.048[a]	-.048[a]	-.023[b]	-.023[b]
	(.011)	(.011)	(.010)	(.010)
	[.399]	[.386]	[.488]	[.477]
Plus time and region dummies	-.012	-.010	.004	.006
	(.007)	(.008)	(.007)	(.008)
	[.403]	[.389]	[.489]	[.479]
Observations	334,588		334,265	

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: [a], [b] and [c] denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses are corrected for clustering at the year-quarter-region level. R-squared values in brackets. All estimates are weighted. All specifications include controls for gender, years of education, marital status, a quadratic in age, a dummy indicator for foreign born workers, occupational and industry dummies and a dummy indicator if the individual works in private sector.

Pooled cross-sectional estimates, QLFS

Table 3 : The impact of (ln) regional unemployment rates on (ln) pay measures in Greece (Pooled estimates)

Dependent variable:	Monthly salary		Hourly wage	
Model specifications	Nominal	Real	Nominal	Real
Panel B: 2009q1-2012q1				
Benchmark model	-.059[a]	-.148[a]	-.038[a]	-.127[a]
	(.011)	(.010)	(.010)	(.010)
	[.449]	[.454]	[.517]	[.519]
Plus time dummies	-.057[a]	-.057[a]	-.026	-.026
	(.021)	(.020)	(.022)	(.021)
	[.450]	[.456]	[.518]	[.521]
Plus time and region dummies	-.003	-.004	.005	.004
	(.016)	(.016)	(.015)	(.015)
	[.455]	[.461]	[.522]	[.524]
Observations	157,920		157,650	

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: [a], [b] and [c] denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses are corrected for clustering at the year-quarter-region level. R-squared values in brackets. All estimates are weighted. All specifications include controls for gender, years of education, marital status, a quadratic in age, a dummy indicator for foreign born workers, occupational and industry dummies and a dummy indicator if the individual works in private sector.

Static and dynamic wage curves, QLFS

Table 4 : Static and dynamic wage curves in Greece (Longitudinal sample, 2007q1-2008q4)

	Monthly salalry (ln)		Hourly wage (ln)	
	Nominal	Real	Nominal	Real
Panel A: Static wage curve-OLS				
Regional unemployment(ln)	-.0006	-.0006	.0006	.0006
	(.0007)	(.0007)	(.0015)	(.0015)
Panel B: Dynamic wage curve-Fixed Effects				
Regional unemployment(ln)	-.0001	-.0001	.0001	.0001
	(.0001)	(.0001)	(.0010)	(.0010)
Lagged dependent variable	.370[a]	.370[a]	.287[a]	.287[a]
	(.044)	(.044)	(.039)	(.039)

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: [a], [b] and [c] denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses have been corrected for clustering at the year-quarter-region level. All estimates are weighted. In the FE model specification we use fixed weights at the individual level computed by averaging quarter-specific individual weights. All specifications include controls for gender, years of education, marital status, a quadratic in age, a dummy indicator for foreign born workers, occupational and industry dummies and a dummy indicator if the individual works in private sector.

Wage curves and bargaining regimes, SES

Table 5 : The impact of (ln) regional unemployment rates on (ln) hourly wage rate in Greece (pooled estimates of 2002 and 2006)

Dependent variable:	Annual pay			Monthly salary			Hourly wage		
Specifications	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
Panel A: Worker-level									
Benchmark	-.198[a]	-.191[a]	.142	-.100[a]	-.097[a]	.003	-.064[a]	-.062[a]	.037
	(.051)	(.048)	(.100)	(.023)	(.023)	(.041)	(.023)	(.023)	(.042)
Regime	-	✓	✓	-	✓	✓	-	✓	✓
Regions	-	-	✓	-	-	✓	-	-	✓
R-squared	.573	.574	.576	.632	.634	.638	.593	.594	.598
Observations		96,387			96,389			96,389	

Source: Structure of Earnings Survey-SES (2002 and 2006), Hellenic Statistical Authority (EL.STAT).
Notes: Matched employee-employer dataset. [a], [b] and [c] denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses are corrected for clustering at the firm level. All specifications include controls for gender, years of education, a quadratic in tenure, occupational, time and industry dummies and a dummy indicator if the individual works in private sector.

Wage curves and bargaining regimes, SES

Table 6 : The impact of (ln) regional unemployment rates on (ln) hourly wage rate in Greece (pooled estimates of 2002 and 2006)

Dependent variable:	Annual pay			Monthly salary			Hourly wage		
Specifications	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
Panel B: Firm-level									
Benchmark	-.048	-.039	-.005	-.113^{c}	-.119^{b}	-.115	-.041	-.040	-.022
	(.130)	(.129)	(.175)	(.063)	(.054)	(.077)	(.046)	(.045)	(.075)
Regime	-	✓	✓	-	✓	✓	-	✓	✓
Regions	-	-	✓	-	-	✓	-	-	✓
R-squared	.338	.340	.351	.378	.382	.391	.457	.460	.466
Observations		5,982			5,981			5,981	

Source: Structure of Earnings Survey-SES (2002 and 2006), Hellenic Statistical Authority (EL.STAT).
Notes: Matched employee-employer dataset. ^{a}, ^{b} and ^{c} denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses are corrected for clustering at the firm level. All specifications include mean values at the firm level for gender, years of education, tenure, occupation, industry affiliation, whether the firm operates in the private sector and a time dummy.

Wage curves and bargaining regimes, SES

Table 7 : The wage curve under different levels of collective bargaining in Greece (worker level, pooled estimates, 2002 and 2006)

Dependent variable:		Annual pay(ln)	Monthly salary(ln)	Hourly wage(ln)
Bargaining regime	Obs.	[1]	[2]	[3]
National agreement	32,921	.049	-.068	-.025
		(.139)	(.073)	(.068)
		[.579]	[.627]	[.619]
Sectoral agreement	48,744	.120	.084	.124
		(.148)	(.081)	(.080)
		[.568]	[.622]	[.577]
Firm-level agreement	9,722	.210	.143	.255
		(.246)	(.107)	(.183)
		[.564]	[.686]	[.613]

Source: Structure of Earnings Survey, 2002 and 2006 (SES), Hellenic Statistical Authority (EL.STAT).
Notes: Standard errors in parentheses are corrected for clustering at the firm level. R-squared values in brackets. All specifications include controls for gender, years of education, a quadratic in tenure, occupational, time and industry dummies and a dummy indicator if the individual works in private sector.

Longitudinal estimates, QLFS

Cell-based

Table 8 : The effect of (ln) regional unemployment rates on mean (ln) pay rates, region-year-quarter means, $2003q1 - 2008q4$

Dependent variable:	(Residual) Hourly wage				(Residual) Monthly salary			
Independent variables	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]
Unemployment(ln)	-.051	-.023	-.008	-.001	-.069	-.024	-.012	-.003
	(.056)	(.014)	(.006)	(.012)	(.057)	(.017)	(.007)	(.011)
Lagged dependent	-	-	.875[a]	.581[a]	-	-	-.856[a]	-.549[a]
			(.054)	(.045)			(.042)	(.037)
Regional dummies	-	✓	-	✓	-	✓	-	✓
R-squared	.162	.760	.843	.880	.220	.787	.850	.884
Observations	312		234		312		234	

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: [a], [b] and [c] denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses. The dependent variable and the lagged dependent are the regional mean residuals from region-year-quarter specific OLS log wage regressions. Controls include gender, years of education, a quadratic in age, marital status, a dummy indicator for foreign born workers, occupational and industry dummies and a dummy indicator if the individual works in private sector. The regressions are weighted by the number of employed workers in the region.

Longitudinal estimates, QLFS

Cell-based

Table 9 : The effect of (ln) regional unemployment rates on mean (ln) pay rates, region-year-quarter means, $2009q1 - 2012q1$

Dependent variable:	(Residual) Hourly wage				(Residual) Monthly salary			
Independent variables	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]
Unemployment(ln)	-.010	.017	-.026	-.047^{b}	.012	.045	-.002	.001
	(.028)	(.013)	(.017)	(.021)	(.039)	(.023)	(.030)	(.049)
Lagged dependent	-	-	.075^{a}	-.569^{a}	-	-	.796	.418
			(.045)	(.092)			(.084)	(.153)
Regional dummies	-	✓	-	✓	-	✓	-	✓
R-squared	.114	.499	.630	.718	.075	.596	.552	.668
Observations	169		117		169		117	

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: ^{a}, ^{b} and ^{c} denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses. The dependent variable and the lagged dependent are the regional mean residuals from region-year-quarter specific OLS log wage regressions. Controls include gender, years of education, a quadratic in age, marital status, a dummy indicator for foreign born workers, occupational and industry dummies and a dummy indicator if the individual works in private sector. The regressions are weighted by the number of employed workers in the region.

The impact of Law 4024/2011

Decentralized wage outcomes and Labour Laws

Table 10 : Number of firm-level agreements by Labour Law and direction of the bargained wage change ($2009m6 - 2012m8$)

Law	Applicable period	$\Delta w < 0$	$\Delta w = 0$	$\Delta w > 0$	Sum
Law 1876/1990	$2009m6 - 2010m9$	.000	.235	.765	1.000
		(0)	(55)	(179)	(234)
Law 3899/2010	$2010m10 - 2011m10$	.189	.455	.354	1.000
		(15)	(36)	(28)	(79)
Law 4024/2011	$2011m11 - 2012m8$	.789	.200	.010	1.000
		(627)	(159)	(8)	(794)
Total	$2009m6 - 2012m8$	.579	.225	.194	1.000
		(642)	(250)	(215)	(1107)

Source: Administrative data from the Ministry of Labour, Social Security and Welfare.
Notes: Number of firm-level collective agreements in parentheses

Decentralized wage outcomes and Labour Laws

Table 11 : Summary statistics of wage changes under different Laws of firm-level contracting ($2009m6 - 2012m8$)

Year	Law 1876/1990			Law 3899/2010			Law 4024/2011		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
2009	.060	.000	.170	-	-	-	-	-	-
2010	.012	.000	.120	.000	.000	.000	-	-	-
2011	-	-	-	-.004	-.200	.048	-.053	-.200	.043
2012	-	-	-	-	-		-.096	-.450	.020
Total	.019	.000	.170	-.004	-.200	.048	-.093	-.450	.043

Source: Administrative data from the Ministry of Labour, Social Security and Welfare.

Decentralized wage outcomes and Labour Laws

Table 12 : The impact of the Law 4024/2011 on the probability of downward wage adjustment regarding contractual wages under firm-level contracting (2009m6-2012m8)

Independent variables	[1]	[2]	[3]	[4]	[5]
Law 4024/2011	.741^a	.554^a	.243^a	.525^a	.279^a
	(.018)	(.026)	(.073)	(.028)	(.068)
Current national unemployment (Raw)	-	-	.034^a	-	-
	-	-	(.006)	-	-
Current national unemployment (HP)	-	-	-	.081^b	.088^b
	-	-	-	(.036)	(.036)
Constant	.047^a	.788^a	-.129	.328^b	.132
	(.012)	(.127)	(.170)	(.137)	(.140)
Legal type dummy	-	✓	✓	✓	✓
Industry dummies	-	✓	✓	✓	✓
Regional dummies	-	✓	✓	✓	✓
Time trend	-	-	-	-	✓
F-test (Industry)	-	[12.74]^a	[12.85]^a	[12.54]^a	[12.12]^a
F-test (Region)	-	[66.61]^a	[29.55]^a	[58.31]^a	[25.34]^a
R-squared	.458	.600	.610	.610	.610
Observations	1,106				

Source: Administrative data from the Ministry of Labour, Social Security and Welfare.
Notes: OLS estimates. ^{a}, ^{b} and ^{c} denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses.

The effect of Law 4024/2011

- Regression-based evidence
  - The unconditional effect of the Law is 0.741, which implies that if a contract is signed under the provisions of L.4024/2011 (compared to L.1876/1990 and L.3899/2010) then there is a higher probability, of around 74%, that the bargained wage outcome will be lower than the existing one
  - In the presence of firm-specific heterogeneity the effect of L.4024/2011 is reduced to 0.554
  - Taking into account (a) firm-specific heterogeneity and (b) the prevailing labour market conditions (current monthly national unemployment rates) the effect of L.4024/2011 is further reduced to 0.243
  - Taking into account (a) firm-specific heterogeneity and (b) the prevailing labour market conditions net of the general macroeconomic trend (de-trended current monthly national unemployment rates) the effect of L.4024/2011 stands at 0.525
  - Taking into account (a) firm-specific heterogeneity and (b) separately the prevailing labour market conditions net of the general macroeconomic trend and the trend itself the effect of L.4024/2011 is reduced at 0.279

Take-away message 1

- The pre-crisis Greek labour market (2003-2008) appears to be insensitive to contemporaneous local labour market conditions (shocks).
  - Similar irresponsiveness was observed in the Nordic labour markets during the 90s. The wage setting was centralized and formulated conditional on a specific national unemployment rate, accompanied by a series of wage drifts at the sectoral and firm levels.

Take-away message 2

- During the crisis (2009-to date)
  - The dramatic jump in the growth of the unemployment rate, observed in 2009q1, signaled in an emphatic way the need to reform the existing labour Law. New legislation was introduced 6 quarters later (Law 3899/2010). Additional legislation was introduced 4 quarters later (Law 4024/2011).
  - Early evidence suggests that the Law 4024/2011 facilitates wage adjustments that are deemed necessary because of the worsening labour market conditions. In any case, the true effect of the law is rather difficult to be identified in the presence of (a) a general macroeconomic trend (b) changing/cyclical unemployment rates and (c) firm-specific attributes. That is, our evidence is necessarily tentative since it is derived from a short time period with strong trends.

Thank You!