Regional labor demand and national labor market institutions in the EU 15

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Objective

- EU labor markets - pronounced regional disparities
- Investigate the responsiveness of regional labor markets
  - ▶ Differences between and within countries?
  - ▶ Determinants of the size of marginal effect of output and wages on employment
- Labor demand function

Literature

- Impact of labor market institutions on unemployment (Nickell et al. 2005, Blanchard & Wolfers 2000)

- Labor demand – focus on elasticities, only a few studies consider impact of institutions (e.g. Neumark & Wascher 2004, Buscher et al. 2005)

- Regional labor market differences: spatial patterns and persistence of unemployment, adjustment to region specific shocks (Overman & Puga 2002, Decressin & Fatás 1995)

⇒ No comprehensive evidence on the joint impact of institutions and structural characteristics of labor markets on regional labor demand

Panel data regression model

- ECM with cross section specific parameters
  - Dependent variable: Employment
  - Explanatory variables: GDP, wage level, interest rate.

$$\begin{aligned}
\Delta l_{it} &= \mu_i + \alpha_i(l_{it-1} - \beta_{1i}w_{it-1} - \beta_{2i}q_{it-1} - \beta_{3i}r_{it-1}) \\
&+ \gamma_{1i}\Delta q_{it} + \gamma_{2i}\Delta w_{it} + \gamma_{3i}\Delta r_{it} + e_{it}, \\
&\quad i = 1, \ldots, N, t = 1, \ldots, T.
\end{aligned}$$

Correlation pattern

- Heteroskedasiticity and spatial correlation
- Error vectors assumed to be contemporaneously correlated:

$$E\left[e_t e_t'\right] = \underset{(N \times N)}{\Omega}.$$

$$\Omega = \Sigma^{1/2} R \Sigma^{1/2}, \ \Sigma = \text{diag}(\sigma_1^2, \sigma_2^2, \ldots, \sigma_N^2), \ \sigma_i^2 = E[e_{it}^2],$$

$$\widehat{R} = \text{Cor}\left((\hat{B}'\hat{B})^{-1}\right), \ \hat{B} = I_N - \hat{\rho}W, \ \text{and} \ \hat{\sigma}_i^2 = \frac{1}{T - |Z|/N}\sum_{t=1}^{T}\hat{e}_{it}^2.$$

Feasible GLS

- Estimates of Ω derived from (unrestricted) cross sectionally heterogeneous variances and correlation pattern based on spatial weight matrices
- Generalized spatial error model (SEM): Feasible grid search over spatial correlation parameter (maximize log likelihood)
- Choice of spatial weight matrix: Log likelihood estimates

Surface Regressions

- Objective: explain the cross sectional pattern of slope estimates (NUTS2, $N = 192$)

- Dependent variables: slope estimates $\hat{\beta}_{1i}, \hat{\beta}_{2i}$ and (inverse) adjustment speed $\hat{\alpha}_i^* = |1 + \hat{\alpha}_i|$ from spatial ECM

- Up to 37 explanatory variables: country and region specific factors

- Specific-to-general modeling strategy (Herwartz 2010)

- Sequential selection of variables with highest marginal explanatory content

- Diagnostics: LM specification tests (tuning parameter δ governs the final surface dimension)

Explanatory variables

- Country specific factors: Labor market institutions -unemployment benefit system, wage determination, employment protection (Nickell & Layard 1999, Bertola et al. 2002, Agell 1999, Kahn 2000)
- Region specific factors
    - Sectoral structure: productivity differences (e.g. Doepke 2001)
    - Structural change: growth – innovation and reallocation of labor between industries – matching frictions due to industry-specific skills (Petrongolo & Pissarides 2001)
    - Agglomeration: reduced matching frictions in dense urban labor markets (Duranton & Puga 2004)
    - Further regional characteristics: age structure, long-term unemployment, educational attainment of population, labor market participation, labor supply (Elhorst 2003)

Data

- Cross section – 192 EU regions (NUTS 2)
- Annual data for the period 1980-2008 (GVA, employment by industry, population, compensation per employee, area, interest rates) – EUROSTAT, CE, AMECO, IFS, IMF
- Labor market indicators 1996-2008 (age, education, participation, accessibility measure, long-term unemployment) – SPESP, EUROSTAT
- Classification scheme (agglomerated, urban, rural), EPL late 1980s, EPL variation in 1980s
- Spatial interaction: binary, inverse travel time, no cross-border interaction

Spatial weights

OLS	binary	travel	travel border
21059.64	21727.67	21865.58	21915.54

Slope estimates (SEM)

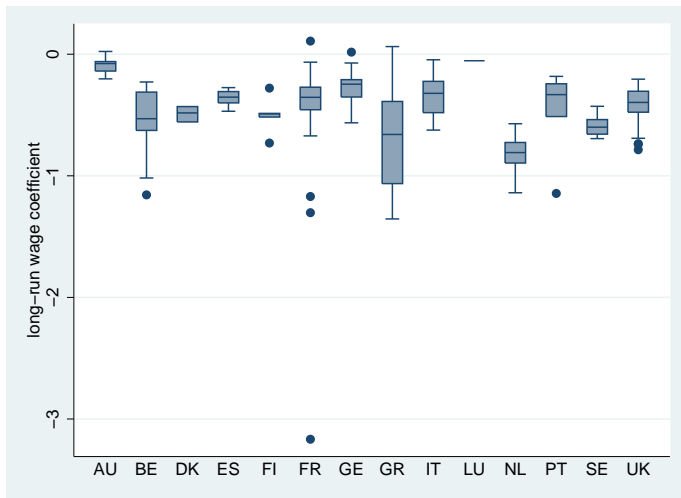|	MG		Quantiles								
	$\bar{\cdot}$	$t(\bar{\cdot})$	.025	.05	.10	.25	.50	.75	.90	.95	.975
ECM/SEM											
$\hat{\alpha}_i$	-0.421	-31.42	-0.894	-0.799	-0.677	-0.490	-0.392	-0.312	-0.246	-0.164	-0.092
$\hat{\beta}_{1i}$	-0.422	-15.50	-1.170	-1.118	-0.785	-0.554	-0.380	-0.243	-0.152	-0.066	0.017
$\hat{\beta}_{2i}$	0.594	22.01	-0.165	0.113	0.201	0.362	0.596	0.764	1.020	1.184	1.382
$\hat{\beta}_{3i}$	0.437	8.10	-0.114	-0.048	0.011	0.094	0.231	0.443	1.034	1.423	2.167

Adjustment coefficients
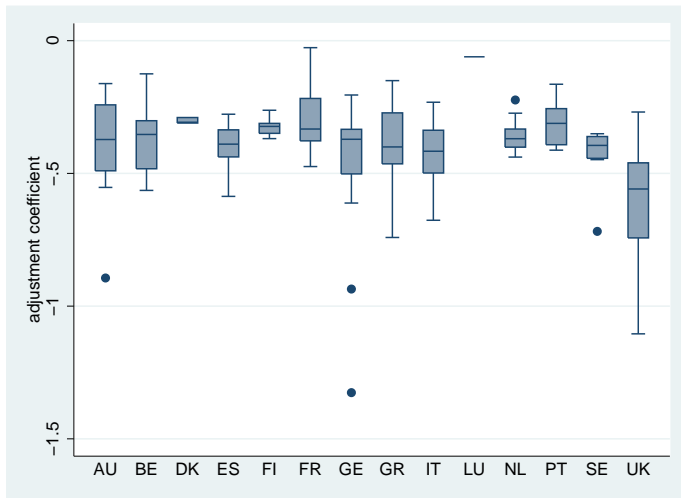
Long-run responses to output
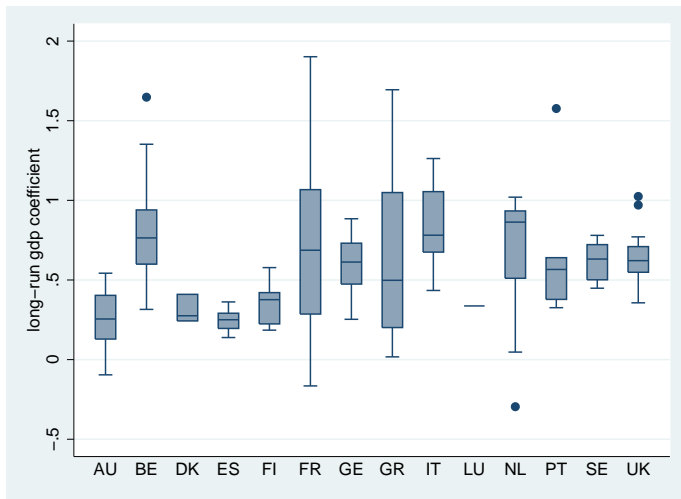
Long-run responses to wages

Surface regressions for $\hat{\alpha}_i^* = |\hat{\alpha}_i + 1|$

Var.	Description	$\hat{q}_{fin}$	t-rat	rob. t	R_p^2	p_{LM}
	$C = 5, \delta = 0.01$					
-	Constant	0.426	19.30	16.16	0.629	0.00
6	Extension laws	0.118	4.674	4.767	0.108	0.00
9	EPL late 1980s	0.029	3.294	3.689	0.057	0.13
	$C = 5, \delta = 0.05$					
-	Constant	0.391	14.34	12.03	0.504	0.00
6	Extension laws	0.137	2.156	2.418	0.025	0.00
9	EPL late 1980s	0.111	4.404	4.657	0.098	0.13
1	Unemployment benefit replacement rat.	0.021	2.212	2.725	0.027	3.14
	$C = 10, \delta = 0.01$					
-	Constant	0.451	17.41	15.88	0.613	0.00
6	Extension laws	0.142	2.615	2.685	0.039	0.00
1	Unemployment benefit replacement rat.	0.099	4.603	4.399	0.111	0.97

Surface regressions for $\hat{\beta}_{1i}$ (wages)

Var.	Description	$\hat{q}_{fin}$	t-rat	rob. t	R_p^2	PLM
	$C = 5, \delta = 0.01$; $C = 5, \delta = 0.05$ ($C = 10, \delta = 0.01$)					
-	Constant	-0.732	-8.625	-8.742	0.288	0.00
3	Active labor market policy	-0.383	-9.800	-9.751	0.349	0.00
8	Total labor tax rate	0.098	3.188	3.239	0.054	0.00
6	Extension laws	0.012	6.562	6.666	0.194	0.17

Surface regressions for $\hat{\hat{\beta}}_{2i}$ (output)

Var.	Description	$\hat{q}_{fin}$	t-rat	rob. t	R_p^2	p_{LM}
	$C = 5, \delta = 0.01$					
-	Constant	1.387	8.520	6.923	0.286	0.00
7	Coordination index	0.595	5.730	5.511	0.155	0.00
1	Unemployment benefit replacement ratio	-0.269	-9.082	-13.14	0.315	0.00
17	Participation rate	-0.009	-3.253	-2.864	0.056	0.14
	$C = 5, \delta = 0.05$					
-	Constant	1.062	5.455	3.812	0.144	0.00
7	Coordination index	0.610	5.302	4.822	0.138	0.00
1	Unemployment benefit replacement rat.	0.004	3.351	3.557	0.060	0.00
17	Participation rate	0.160	2.444	2.031	0.033	0.14
10	Change EPL	-0.297	-7.786	-9.231	0.257	2.82
5	Union density	-0.506	-3.243	-3.331	0.057	1.04
6	Extension laws	-0.005	-1.484	-1.115	0.012	2.74
25	Fuels and Chemicals	-2.827	-2.072	-2.118	0.024	3.63

Conclusions

- Considerable variation in labor market responses – across and within countries
- Weak evidence on significance of region-specific factors, but spatial dependence matters
- Labor market institutions matter:
  - Extension laws, employment protection reduce adjustment speed
  - Active labor market policy fosters employment response to wages
  - Co-ordination has a positive impact on the response to output changes
  - Effects of unemployment benefit system unclear