The elusive quest for the holy grail of an impact of EU funds on regional growth

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The views expressed in this paper are those of the authors and do not necessarily represent the official position of the Government Office of the Slovak Republic

Introduction (1)

Cohesion policy (CP) $\approx$ 35% of the EU budget: 2nd largest spending item in the EU budget after CAP.

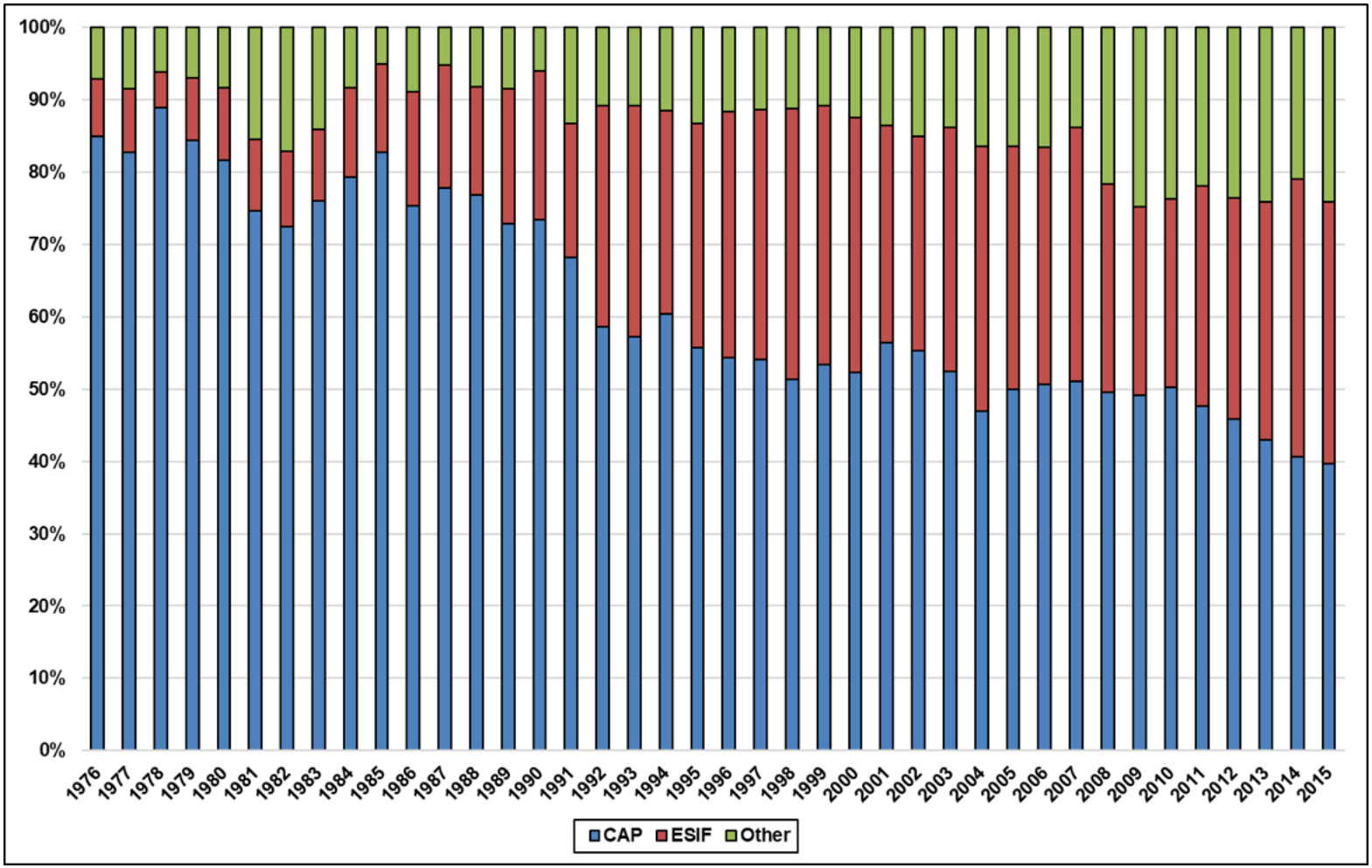
CP growing in importance, especially after Southern and Eastern enlargements of the EU.

Objectives:

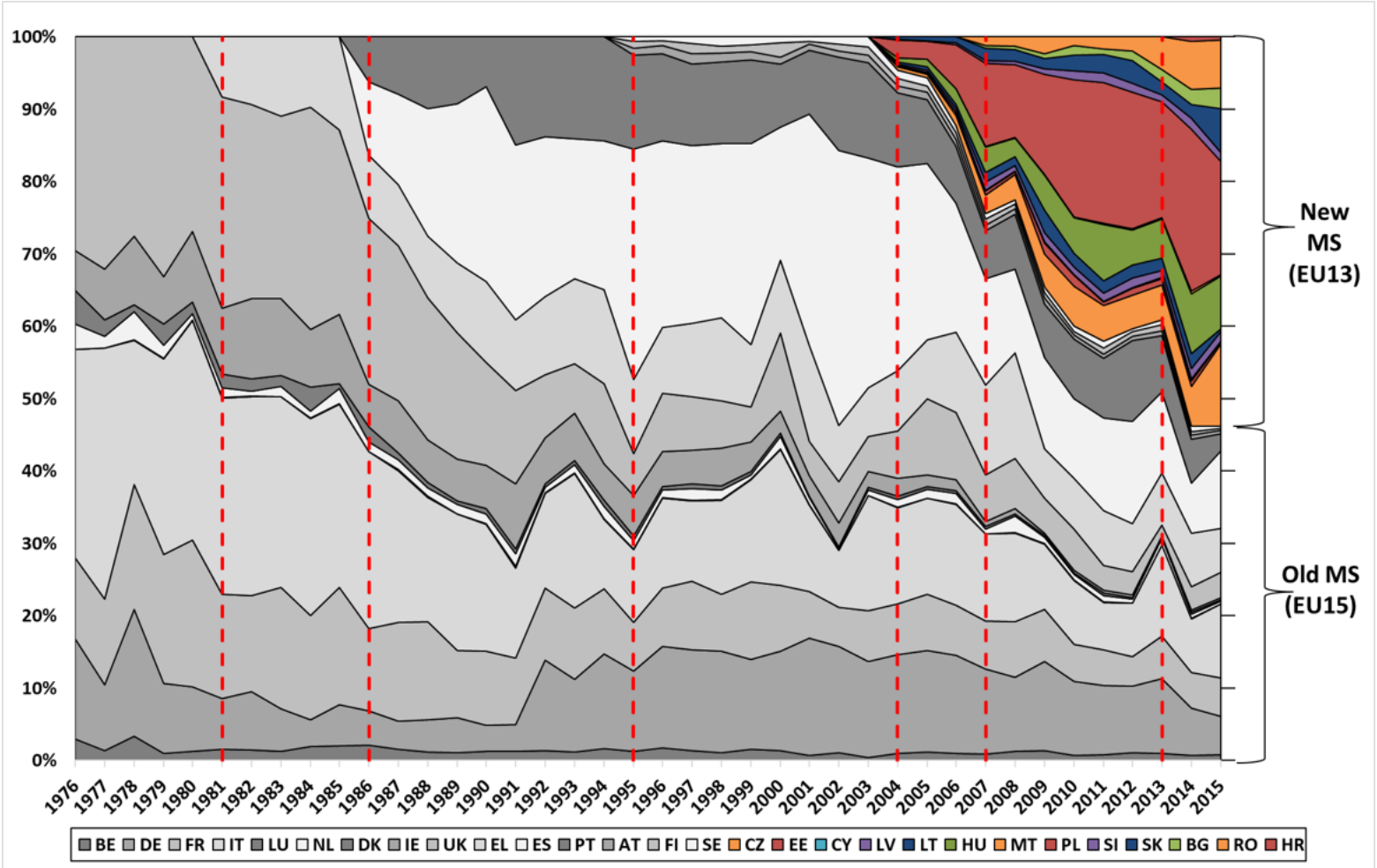
- job creation,
- competitiveness,
- economic growth,
- sustainable development,
- quality of life

How much bang does the EU get for its buck?

Introduction (2)



Introduction (3)



Methodological challenges

Poor regions tend to growth faster (convergence) but are are also the main recipients of Cohesion Policy payments –> upwards bias.

Cohesion Policy payments increase when economic growth below EU average –> downwards bias.

Result: Endogeneity bias upwards or downwards. The estimate of CP effect may overestimate or underestimate the true effect.

Standard solution: Use of instrumental variables.

Finding strong and convincing instruments is notoriously difficult.

Previous Literature (1)

Inconclusive findings on the effects of Cohesion Policy on regional economic growth:

- Positive impact: Beugelsdijk and Eijffinger (2005), Bradley et al. (2004), Bradley and Untiedt (2007), Maynou et al. (2014), Radvansky et al. (2015), Venables and Gasiorek (1999)
- Insignificant or negative effect: Boldrin et al. (2001), Fagerberg and Verspagen (1996), Dall'Erba et al. (2007), Dall'Erba and Le Gallo (2008), Eggert et al. (2007)
- Potential sources of the differences in findings: "learning effect", endogeneity bias, and inclusion of interaction terms as well as human capital and institutional quality variables (Dall'erba and Fang, 2017)

Previous Literature (2)

Endogeneity likely, largely ignored. Notable exceptions: Becker et al. (2010, 2018), Pellegrini et al. (2013), Dall'Erba and Le Gallo (2008), Cerqua and Pellegrini (2018).

- Becker et al. (2010), Becker et al. (2018) and Pellegrini et al. (2013): RDD analysis near Convergence Objective threshold (75% of EU average). Positive effect on regional output growth: €1 invested in Cohesion Policy raises output by €1.2. No effect on employment growth.
- Dall'Erba and Le Gallo (2008): Generalized spatial 2SLS (GS2SLS), with geographical distance and travel time to Brussels as instrumental variables. Convergence among European regions ongoing, but EU Funds do not foster convergence. Inter-regional spillovers in the core regions of the EU, but limited in periphery.
- Issues: RDD treatment measured by dummy variable, not by *intensity*; assignment of Conv Obj status sometimes deviates from the formal rule (–> either fuzzy RDD or misassigned regions dropped); 50 % of CP funding earmarked for Conv Obj regions – relatively well off regions can be funded under other objectives.

This paper – Contributions

- One of the first studies to use of *yearly* data on CP payments;
- We estimate the effect of Cohesion Policy while taking account of the likely endogeneity bias by using the presence of environmentally-protected areas as *instruments* for CP receipts in the assessment of its effect on regional economic growth;
- We estimate a spatial model to account for the possible inter-regional spillovers of CP.

Natura 2000 Network

- Network of terrestrial and marine conservation areas protecting threatened habitats and species.
- 27,312 sites at present, accounting for 18% of EU area.
- Sites vary because of presence of endangered species, they range from wild and sparsely inhabited areas to farmland and urban areas.
- Harmful activities are prohibited or regulated.
- Potential instrument for Cohesion Policy because of constraints on industrial use and infrastructure development. Economic activity and construction not banned, but needs to take account of protected status.
- Limited direct funding: less than €6 mn annually (compared to €350 bn CP budget).

This paper – Findings

- CP payments have positive impact on regional growth;
- 2SLS estimates higher than OLS estimates: OLS biased downwards;
- Stronger effects in new member states, low or negative effects in Southern European countries;
- Inter-regional spillovers important.
- Quantifying the effect: multiplier positive, less than one.

Methodology: OLS (1)

Solow growth model at regional level for region j in country i during program period t:

$$\Delta \ln(y_{ijt}) = \beta_0 + \beta_1 \ln(y_{ijt-1}) + \beta_2 \ln(s_{ijt}) + \beta_3 \ln(g_{ijt} + n_{ijt} + \delta_{ijt}) + \beta_4 inst_{it} + \mu_j + \tau_t + u_{ijt}$$

Notes:

- $g_{ijt} + \delta_{ijt} = 0.06$

Methodology: OLS (2)

Solow growth model at regional level for region j in country i during program period t:

$$\begin{aligned}\Delta \ln(y_{ijt}) =& \beta_0 + \beta_1 \ln(y_{ijt-1}) + \beta_2 \ln(s_{ijt}) + \beta_3 \ln(g_{ijt} + n_{ijt} + \delta_{ijt}) + \beta_4 inst_{it} \\ &+ \gamma_1 \ln(eufr_{ijt}) \\ &+ \mu_j + \tau_t + u_{ijt}\end{aligned}$$

Notes:

- $g_{ijt} + \delta_{ijt} = 0.06$
- $\ln(eufr_{ijt}) = \ln\left(euf_{ijt}/gdp_{ijt} + 1\right)$

Methodology: OLS (3)

Solow growth model at regional level for region j in country i during program period t:

$$\begin{aligned}\Delta \ln(y_{ijt}) =& \beta_0 + \beta_1 \ln(y_{ijt-1}) + \beta_2 \ln(s_{ijt}) + \beta_3 \ln(g_{ijt} + n_{ijt} + \delta_{ijt}) + \beta_4 inst_{it} \\ &+ \gamma_1 \ln(eufr_{ijt}) \\ &+ \gamma_2 \ln(eufr_{ijt}) * NMS10 + \gamma_3 ln(eufr_{ijt}) * NMS3 \\ &+ \gamma_4 ln(eufr_{ijt}) * GIPS \\ &+ \gamma_5 ln(eufr_{ijt}) * inst_{it} \\ &+ \mu_j + \tau_t + u_{ijt}\end{aligned}$$

Notes:

- $g_{ijt} + \delta_{ijt} = 0.06$
- $\ln(eufr_{ijt}) = \ln(euf_{ijt}/gdp_{ijt} + 1)$
- $NMS10$: NMS class of 2004
- $NMS03$: NMS classes of 2007 and 2013
- $GIPS$: Greece, Italy, Portugal, Spain

Methodology: 2SLS

We instrument EU funds with share of region's area covered by Natura 2000 sites

$$\begin{aligned}\Delta \ln(y_{ijt}) =& \beta_0 + \beta_1 \ln(y_{ijt-1}) + \beta_2 \ln(s_{ijt}) + \beta_3 \ln(g_{ijt} + n_{ijt} + \delta_{ijt}) + \beta_4 inst_{it} \\ &+ \gamma_1 \ln(eufr_{ijt}) \\ &+ \mu_j + \tau_t + u_{ijt}\end{aligned}$$

Notes:

- $g_{ijt} + \delta_{ijt} = 0.06$
- $\ln(eufr_{ijt}) = \ln\left(euf_{ijt}/gdp_{ijt} + 1\right)$
- Instruments: $\ln\left(areaprop_{ijt} + 1\right)$, $\ln\left(count_{ijt} + 1\right)$

Methodology: SDM (1)

The spatial weight matrix has the following form:

$$w_{ij} = \begin{cases} 0 & \text{if } i = j \\ \frac{d_{ij}^{-2}}{\sum_1^j d_{ij}^{-2}} & \text{if } d_{ij} \leq D(k) \text{ for } k = \{1; 2; 3\} \\ 0 & \text{if } d_{ij} > D(k) \end{cases}$$

where:

- w_{ij} is the element of the $\mathbf{W}$ matrix
- d_{ij} is the distance between two regions
- $D(k)$ is the threshold distance based on quantile k

SDM (1)

$$\Delta \ln(\mathbf{y}) = \rho(\mathbf{I}_T \otimes \mathbf{W})\Delta\mathbf{y} + \mathbf{X}\beta + (\mathbf{I}_T \otimes \mathbf{W})\mathbf{X}\theta + \mu + \mathbf{u}$$

with marginal effects computed as:

$$\mathbf{S} = \frac{\Delta \ln(\mathbf{y})}{\Delta \mathbf{x_{ik}}} = (\mathbf{I}_{NT} - \rho\mathbf{I}_T \otimes \mathbf{W})^{-1}(\mathbf{I}_{NT}\beta_k + \mathbf{I}_T \otimes \mathbf{W}\theta_k)$$

$ADE = \frac{1}{nt} tr(\mathbf{S})$; $ATE = \frac{1}{nt} \iota' \mathbf{S} \iota$; $AIE = ATE - ADE$

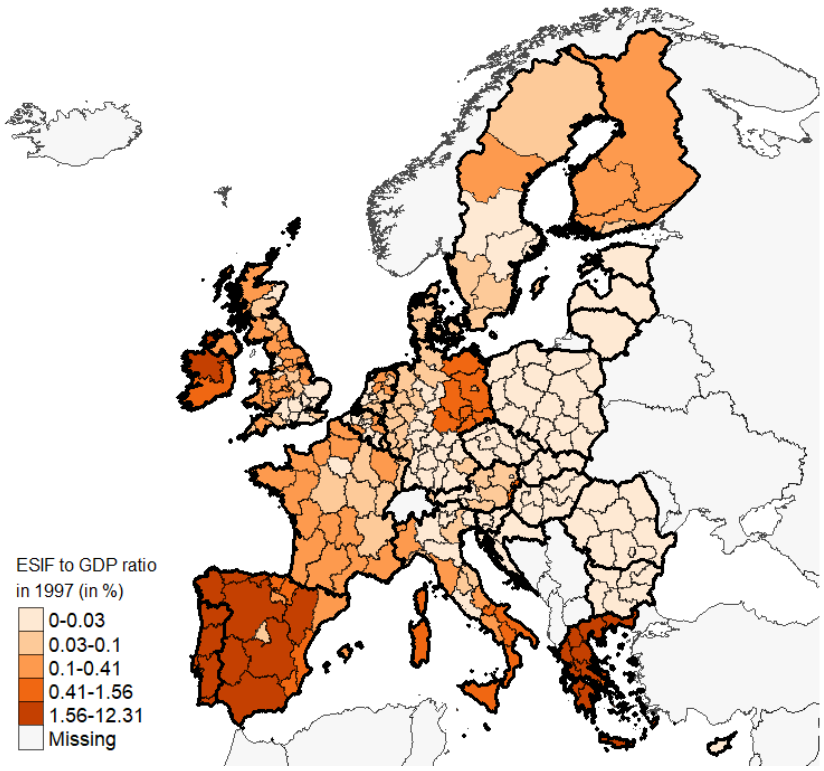
Notes:

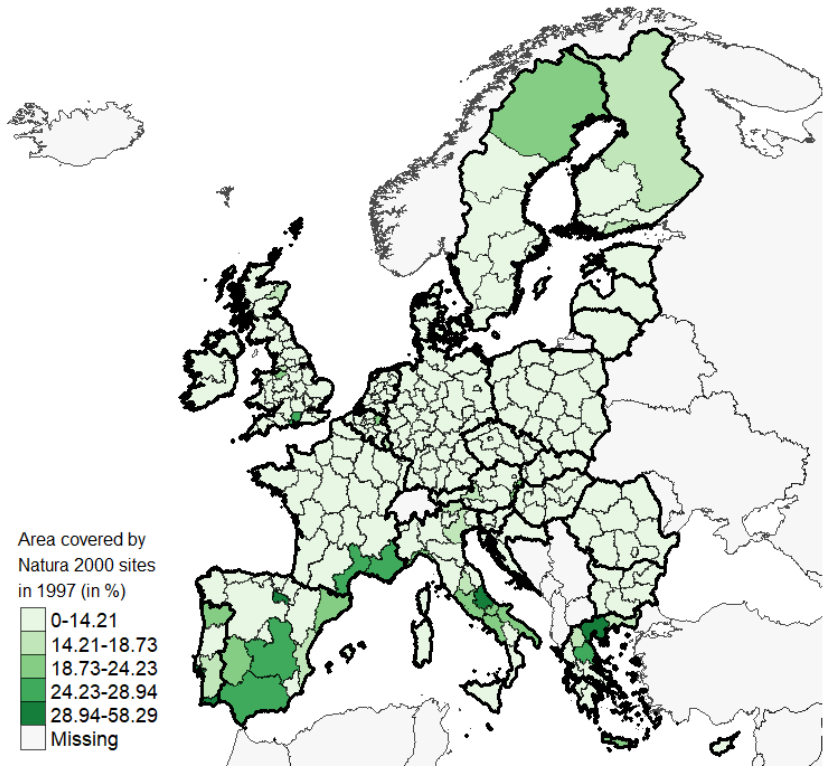
- ρ is the coefficient of spatial autocorrelation
- $\mathbf{X}$ contains the independence variables (Solow variables, institutional quality, CP)
- ADE, AIE, and ATE denote the average direct, indirect and total effects respectively

Data

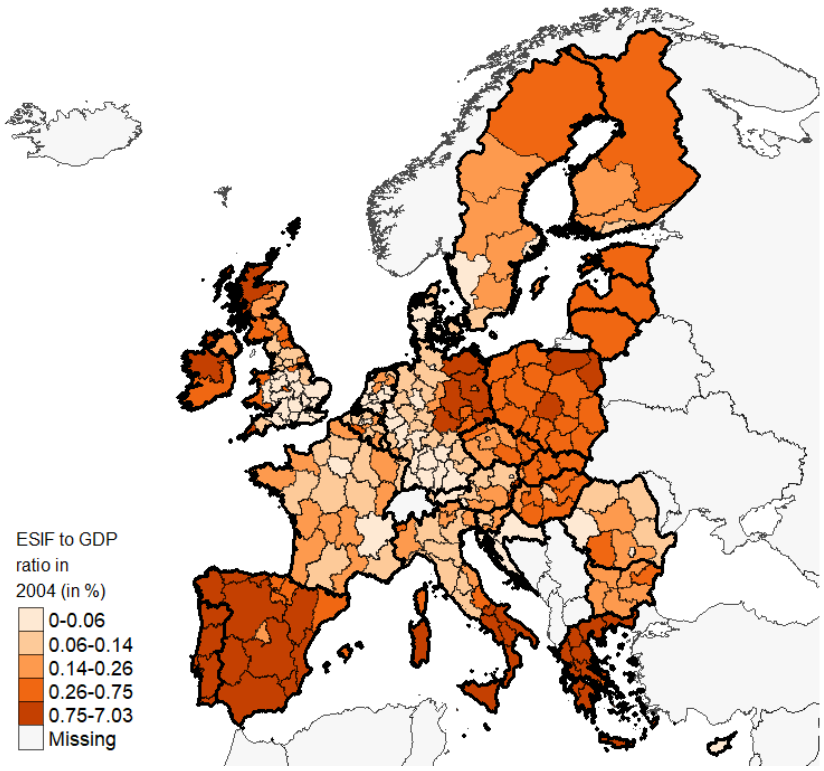
- Cohesion Policy payments at NUTS2 level (DG Regio): new annualized data on payments.
- Natura 2000 sites assigned to NUTS2 regions using spatial data from the European Environmental Agency and GISCO
- Regional economic statistics (NUTS2) from Cambridge Econometrics Regional Database.
- Institutional quality: PCA of the *Worldwide Governance Indicators* from the World Bank (national level) - Voice and Accountability, Political Stability and Lack of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption.
- Overall: 272 NUTS2 regions over 1997-2014.

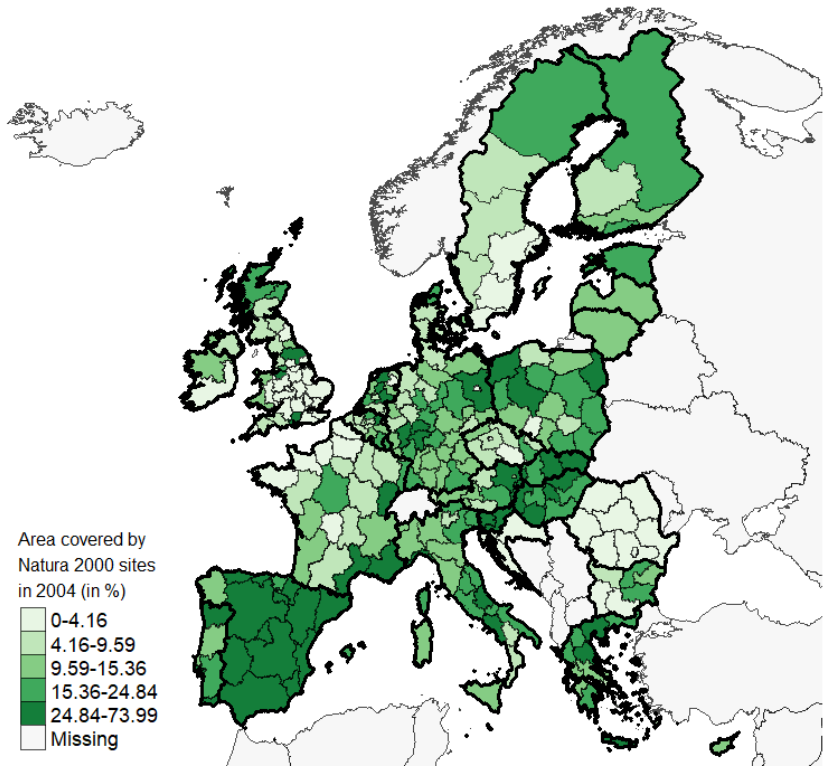
Cohesion Policy and Natura 2000 Density: 1997



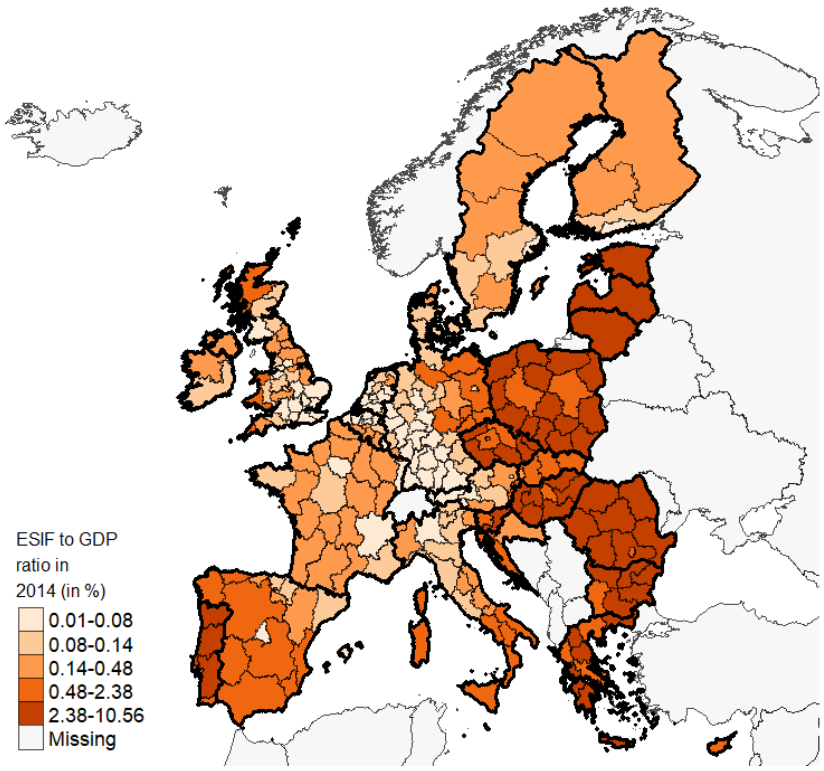


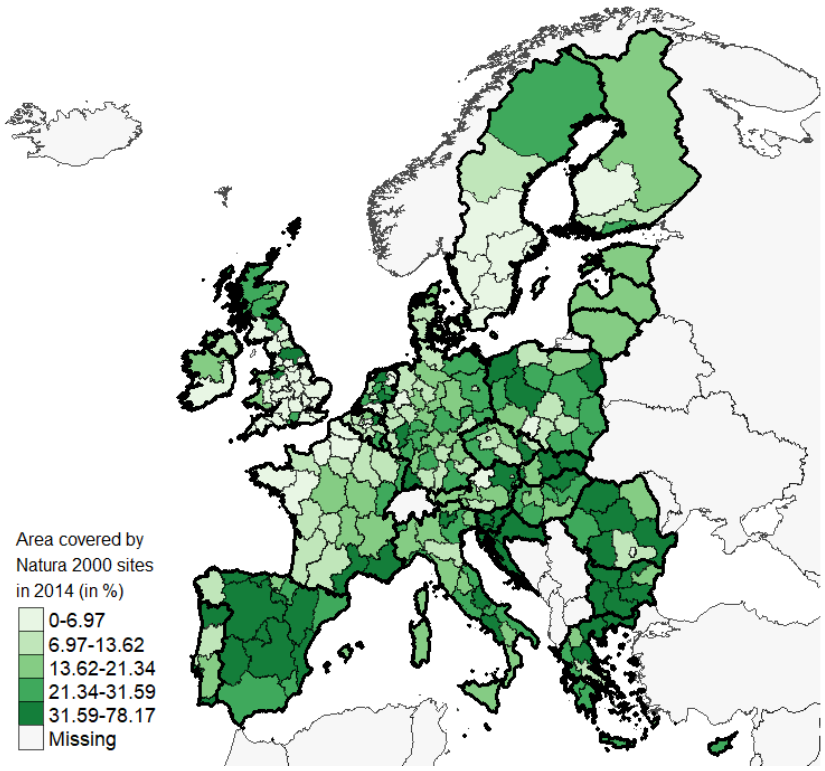
Cohesion Policy and Natura 2000 Density: 2004





Cohesion Policy and Natura 2000 Density: 2014





European Funds and Regional Growth: OLS Results

	(1) $\Delta \ln y_{ijt}$	(2) $\Delta \ln y_{ijt}$	(3) $\Delta \ln y_{ijt}$	(4) $\Delta \ln y_{ijt}$	(5) $\Delta \ln y_{ijt}$
lny_{ijt-1}	-0.095^{***}	-0.107^{***}	-0.137^{***}	-0.135^{***}	-0.147^{***}
	(0.020)	(0.022)	(0.022)	(0.020)	(0.022)
lns_{ijt}	0.036^{***}	0.033^{***}	0.025^{***}	0.026^{***}	0.024^{***}
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
$ln(n_{ijt} + g_{ijt} + \delta_{ijt})$	-0.036^{***}	-0.035^{***}	-0.036^{***}	-0.036^{***}	-0.035^{***}
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
$ln(eufr_{ijt} + 1)$		0.395^{***}	0.413^{***}	0.517^{***}	0.017
		(0.145)	(0.123)	(0.201)	(0.391)
$wgipca_{it}$			0.014^{***}	0.013^{***}	0.014^{***}
			(0.002)	(0.002)	(0.002)
$ln(euf_{ijt})$*$wgipca_{it}$				0.061	
				(0.057)	
$ln(eufr_{ijt})$*$EU10$					0.543
					(0.413)
$ln(eufr_{ijt})$*$EU2$					0.775^{*}
					(0.422)
$ln(eufr_{ijt})$*$GIPS$					0.044
					(0.459)
Convergence rate	9.98%	11.32%	14.73%	14.50%	15.90%
Half-life	7.29	6.47	5.04	5.12	4.70
Observations	4,896	4,896	4,896	4,896	4,896
R^2	0.358	0.364	0.387	0.388	0.390
F-statistic	150.798^{***}	125.63^{***}	138.52^{***}	116.15^{***}	89.39^{***}
Regional FEs	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. Significance: *p $<$0.1; **p$<$0.05; ***p$<$0.01.

European Funds and Regional Growth: 2SLS results

	Dependent variable:					
	$\Delta \ln y_{ijt}$	$ln(eufr_{ijt}+1)$	$\Delta \ln y_{ijt}$	$ln(eufr_{ijt}+1)$	$\Delta \ln y_{ijt}$	$ln(eufr_{ijt}+1)$
	(1)	(2)	(3)	(4)	(5)	(6)
$ln(y_{ijt-1})$	-0.143^{***}	0.024^{***}	-0.178^{***}	0.024^{***}	-0.187^{***}	0.020^{***}
	(0.010)	(0.001)	(0.010)	(0.002)	(0.014)	(0.004)
lns_{ijt}	0.024^{***}	0.006^{***}	0.016^{***}	0.007^{***}	0.0136^{**}	0.007^{***}
	(0.004)	(0.001)	(0.004)	(0.001)	(0.006)	(0.001)
$ln(n_{ijt}+g_{ijt}+\delta_{ijt})$	-0.029^{***}	-0.003^{***}	-0.030^{***}	-0.003^{***}	-0.029^{***}	-0.0027^{**}
	(0.004)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)
$ln(eufr_{ijt}+1)$	1.611^{***}		1.749^{***}		2.037^{***}	
	(0.263)		(0.262)		(0.236)	
$ln(areaprop_{ijt}+1)$		0.030^{***}		0.030^{***}		0.006^{*}
		(0.002)		(0.002)		(0.003)
$ln(count_{ijt}+1)$						0.002^{***}
						(0.0002)
$wgipca_{it}$			0.014^{***}	-0.0003	0.015^{***}	-0.001^{**}
			(0.001)	(0.0003)	(0.002)	(0.0004)
Convergence rate	15.43%		19.06%		20.70%	
Half-life	4.83		3.87		3.68	
Observations	4,896	4,896	4,896	4,896	4,896	4,896
R^2	0.067	0.171	0.089	0.171	0.282	
F statistic	17.204^{***}	236.548^{***}	28.416^{***}	189.441^{***}	89.66^{***}	112.21^{***}
Hansen J statistic	N/A		N/A		1.930	
Regional FEs	Yes	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. Significance: *p<0.1; **p<0.05; ***p<0.01.

European Funds: Inter-regional Spillovers (1)

	(1) gdppcgr	(2) gdppcgr	(3) gdppcgr
ρ	0.740***	0.776***	0.795***
	(0.0225)	(0.0231)	(0.0233)
$\ln(y_{ijt-1})$	-0.161***	-0.151***	-0.145***
	(0.0165)	(0.0153)	(0.0146)
$\ln(s_{ijt})$	0.00274	0.00353	0.00425
	(0.00643)	(0.00644)	(0.00645)
$\ln(n_{ijt}+g+\delta)$	-0.0331***	-0.0342***	-0.0349***
	(0.00425)	(0.00428)	(0.00427)
$wgipca_{it}$	0.0117***	0.0104***	0.00970***
	(0.00265)	(0.00257)	(0.00256)
$\ln(eufr_{ijt}+1)$	-0.00527	-0.000145	-0.00129
	(0.131)	(0.132)	(0.127)
$\ln(eufr_{ijt}+1) * wgipca_{it}$	-0.0189	-0.0555	-0.0763
	(0.0647)	(0.0594)	(0.0599)
$\mathbf{W} * \ln(y_{ijt-1})$	0.131***	0.125***	0.121***
	(0.0168)	(0.0161)	(0.0156)
$\mathbf{W} * \ln(s_{ijt})$	0.0219**	0.0229**	0.0241**
	(0.00915)	(0.00997)	(0.0107)
$\mathbf{W} * \ln(n_{ijt}+\delta+g)$	0.0339**	0.0359*	0.0395*
	(0.0162)	(0.0191)	(0.0206)
$\mathbf{W} * \ln(wgipca_{it})$	-0.00977***	-0.00820**	-0.00671*
	(0.00340)	(0.00378)	(0.00398)
$\mathbf{W} * \ln(eufr_{ijt}+1)$	0.299	0.349	0.380
	(0.215)	(0.240)	(0.255)
$\mathbf{W} * \ln(eufr_{ijt}+1) * wgipca_{it}$	0.0782	0.132	0.171
	(0.0991)	(0.106)	(0.118)
$\lambda_{spatial}$	11.88%	12.10%	12.22%
Half-life	5.84	5.73	5.67
Observations	4734	4734	4734
Log-likelihood	10715.95	10694.94	10683.88
AIC	-21379.9	-21337.9	-21315.8
BIC	-21211.9	-21169.9	-21147.8
Coefficient test $\theta = 0$ (χ^2)	77.92***	76.72***	76.24***
Coefficient test $\theta = -\beta\rho$	29.87***	25.57***	26.65***
Hausman test	156.17***	159.17***	163.47***
Regional FEs	Yes	Yes	Yes
Time FEs	No	No	No

Notes: Robust standard errors in parentheses.
Significance: *p<0.1; **p<0.05; ***p<0.01.

European Funds: Inter-regional Spillovers (2)

	(1) $\Delta \ln y_{ijt}$ D(1)	(2) $\Delta \ln y_{ijt}$ D(2)	(3) $\Delta \ln y_{ijt}$ D(3)
Average Direct Effects			
$\ln(y_{ijt-1})$	-0.159***	-0.149***	-0.144***
	(0.0167)	(0.0155)	(0.0149)
$\ln(s_{ijt})$	0.00602	0.00670	0.00747
	(0.00671)	(0.00667)	(0.00665)
$\ln(n_{ijt}+g+\delta)$	-0.0313***	-0.0325***	-0.0329***
	(0.00397)	(0.00398)	(0.00403)
$wgipca_{it}$	0.0114***	0.0103***	0.00970***
	(0.00248)	(0.00238)	(0.00236)
$\ln(eufr_{ijt}+1)$	0.0385	0.0464	0.0455
	(0.125)	(0.126)	(0.120)
$\ln(eufr_{ijt}+1) * wgipca_{it}$	-0.00696	-0.0414	-0.0606
	(0.0608)	(0.0558)	(0.0551)
Average Indirect Effects			
$\ln(y_{ijt-1})$	0.0464	0.0350	0.0291
	(0.0293)	(0.0358)	(0.0405)
$\ln(s_{ijt})$	0.0879***	0.111**	0.130**
	(0.0333)	(0.0427)	(0.0503)
$\ln(n_{ijt}+g+\delta)$	0.0382	0.0453	0.0623
	(0.0554)	(0.0776)	(0.0938)
$wgipca_{it}$	-0.00385	-0.0000607	0.00537
	(0.00677)	(0.00953)	(0.0113)
$\ln(eufr_{ijt}+1)$	1.049 *	1.450*	1.728*
	(0.630)	(0.845)	(1.010)
$\ln(eufr_{ijt}+1) * wgipca_{it}$	0.229	0.373	0.506
	(0.260)	(0.345)	(0.424)
Average Total Effects			
$\ln(y_{ijt-1})$	-0.112***	-0.114***	-0.115***
	(0.0304)	(0.0376)	(0.0429)
$\ln(s_{ijt})$	0.0940**	0.117**	0.138**
	(0.0368)	(0.0460)	(0.0533)
$\ln(n_{ijt}+g+\delta)$	0.00688	0.0128	0.0294
	(0.0563)	(0.0786)	(0.0950)
$wgipca_{it}$	0.00755	0.0102	0.0151
	(0.00620)	(0.00885)	(0.0106)
$\ln(eufr_{ijt}+1)$	1.088 *	1.497*	1.774*
	(0.640)	(0.854)	(1.017)
$\ln(eufr_{ijt}+1) * wgipca_{it}$	0.222	0.331	0.445
	(0.252)	(0.337)	(0.412)

Notes: Robust standard errors in parentheses. Significance: *p<0.1; **p<0.05; ***p<0.01.

How much bang does the EU get for its buck?

$$\ln(Y_{ijt}) = \beta_0 + \beta_1 \ln(Y_{ijt-1}) + \beta_2 \ln(S_{ijt}) + \beta_3 \ln(P_{ijt}) + \beta_4 inst_{it}$$
$$+ \gamma_1 \ln(EUF_{ijt}) + \sum_{i=2}^{28} \gamma_i \ln(EUF_{ijt}) * D_i$$
$$+ \mu_j + \tau_t + u_{ijt}$$

$$e_{ij} = \frac{\frac{\Delta Y_{ijt}}{\Delta EUF_{it}}}{\frac{Y_{ijt}}{EUF_{ijt}}} \Rightarrow \frac{\Delta Y_{ijt}}{\Delta EUF_{it}} = \frac{e_{ij}}{\frac{EUF_{ijt}}{Y_{ijt}}} = \frac{\gamma_1 + \gamma_i}{\frac{EUF_{ijt}}{Y_{ijt}}}$$

- $\ln(EUFr_{ijt}) = \ln(EUF_{ijt}/Y_{ijt})$
- e_{ij}: output elasticity for region j in member state i
- D_i: dummy for member state i

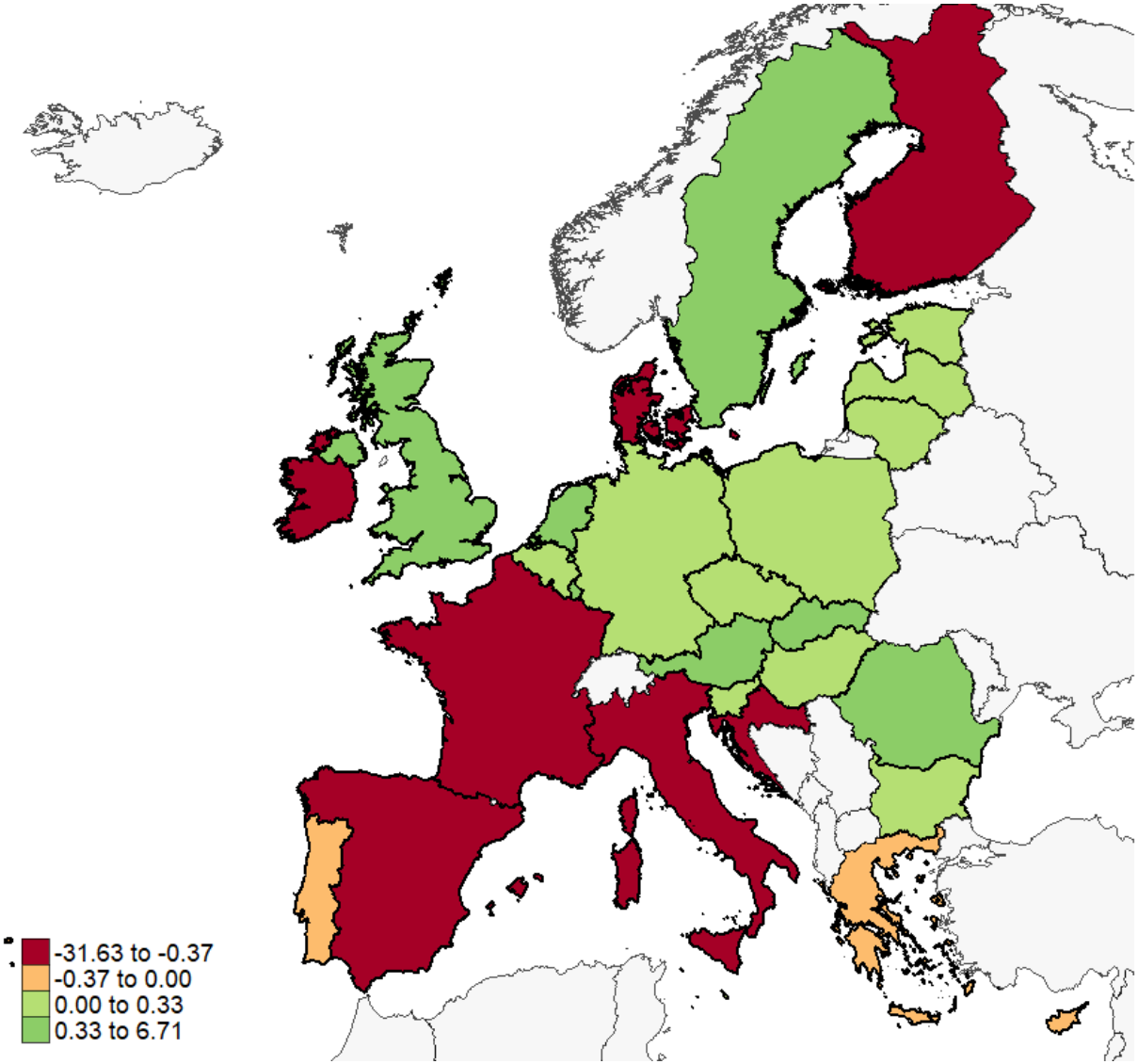
isa

European Funds and Regional GDP (level): OLS/2SLS

	(1) $\ln Y_{ijt}$	(2) $\ln Y_{ijt}$	(3) $\ln Y_{ijt}$	(4) $\ln Y_{ijt}$	(5) $\ln Y_{ijt}$	(6) $\ln Y_{ijt}$	(7) $\ln(EUF_{ijt}+1)$	(8) $\ln Y_{ijt}$	(9) $\ln(EUF_{ijt}+1)$
$\ln Y_{ijt-1}$	0.809***	0.789***	0.773***	0.773***	0.767***	0.778***	10.304***	0.765***	8.421***
	(0.019)	(0.018)	(0.017)	(0.017)	(0.017)	(0.015)	(1.088)	(0.013)	(0.983)
$\ln S_{ijt}$	0.069***	0.064***	0.058***	0.056***	0.055***	0.059***	2.8085***	0.056***	3.096***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.356)	(0.005)	(0.346)
$\ln P_{ijt}$	−0.034*	0.021	0.044**	0.053***	0.063***	0.031	-25.161***	0.0648***	-19.317***
	(0.019)	(0.021)	(0.020)	(0.020)	(0.019)	(0.022)	(1.580)	(0.020)	(1.490)
$\ln(EUF_{ijt}+1)$		0.0016***	0.0017***	0.0013***	−0.0006	0.0013***		0.0023***	
		(0.0003)	(0.0003)	(0.0003)	(0.0007)	(0.0005)		(0.0004)	
$wgipca_{it}$			0.010***	0.014***	0.011***	0.010***	0.005	0.010***	-0.4268***
			(0.002)	(0.003)	(.002)	(0.001)	(0.129)	(0.001)	(0.117)
$\ln(areaprop_{ijt}+1)$							15.7307***		
							(1.140)		
$\ln(count_{ijt}+1)$									1.490***
									(0.084)
$\ln(EUF_{ijt}+1)$*$wgipca_{it}$				−0.0001					
				(0.0002)					
$\ln(EUF_{ijt}+1)$*$EU10$					0.0022***				
					(0.0007)				
$\ln(EUF_{ijt}+1)$*$EU3$					0.0031***				
					(0.0009)				
$\ln(EUF_{ijt}+1)$*$GIPS$					−0.0074***				
					(0.0028)				
Implied Multiplier Effects:									
Overall		0.235	0.238	0.190		0.196		0.348	
Old MS					−0.299				
EU10					0.130				
EU3					0.255				
GIPS					−0.519				
Observations	4,896	4,896	4,896	4,896	4,896	4,896	4,896	4,896	4,896
R^2	0.952	0.953	0.954	0.955	0.955	0.954		0.954	
F-stat							190.26***		314.24***
Regional FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	2SLS		2SLS	

Notes: Robust standard errors in parentheses. Significance: *p<0.1; **p<0.05; ***p<0.01.

How much bang does the EU get for its buck?



	Dependent variable: lnY_{ijt}			
	elasticity	st.dev.	euf/y	multiplier
lnY_{ijt-1}	0.7544^{***}	(0.010)		
lnS_{ijt}	0.0733^{***}	(0.0054)		
lnP_{ijt}	0.8405^{***}	(0.0163)		
$wgipca_{it}$	0.0063^{***}	(0.0014)		
$ln(EUF_{it}+1) * at$	0.0047^{***}	(0.0016)	0.0021	2.2838
$ln(EUF_{it}+1) * be$	0.0003	(0.0008)	0.0011	0.2985
$ln(EUF_{it}+1) * bg$	0.0006	(0.0012)	0.0123	0.0501
$ln(EUF_{it}+1) * cy$	-0.0002	(0.0001)	0.0022	-0.0875
$ln(EUF_{it}+1) * cz$	0.0019^{***}	(0.0002)	0.0086	0.2256
$ln(EUF_{it}+1) * de$	0.0005	(0.0018)	0.0023	0.2405
$ln(EUF_{it}+1) * dk$	-0.0143^{***}	(0.0021)	0.0005	-31.6278
$ln(EUF_{it}+1) * ee$	0.0010^{***}	(0.0003)	0.0149	0.0642
$ln(EUF_{it}+1) * el$	-0.0054	(0.0045)	0.0276	-0.1970
$ln(EUF_{it}+1) * es$	-0.0079^{***}	(0.0014)	0.0119	-0.6685
$ln(EUF_{it}+1) * fi$	-0.0081	(0.0091)	0.0022	-3.6294
$ln(EUF_{it}+1) * fr$	-0.0127^{***}	(0.0030)	0.0032	-3.9850
$ln(EUF_{it}+1) * hr$	-0.0018^{***}	(0.0005)	0.0005	-3.3224
$ln(EUF_{it}+1) * hu$	0.0001	(0.0006)	0.0192	0.0044
$ln(EUF_{it}+1) * ie$	-0.0041	(0.0056)	0.0067	-0.6094
$ln(EUF_{it}+1) * it$	-0.0092^{*}	(0.0054)	0.0042	-2.2110
$ln(EUF_{it}+1) * lt$	0.0031^{***}	(0.0003)	0.0166	0.1886
$ln(EUF_{it}+1) * lu$	0.0026^{***}	(0.0009)	0.0004	6.7068
$ln(EUF_{it}+1) * lv$	0.0020^{***}	(0.0003)	0.0153	0.1334
$ln(EUF_{it}+1) * mt$	0.0005^{***}	(0.0001)	0.0057	0.0958
$ln(EUF_{it}+1) * nl$	0.0019	(0.0022)	0.0009	2.1692
$ln(EUF_{it}+1) * pl$	0.0021^{***}	(0.0003)	0.0143	0.1491
$ln(EUF_{it}+1) * pt$	-0.0103^{***}	(0.0028)	0.0354	-0.2916
$ln(EUF_{it}+1) * ro$	0.0039^{***}	(0.0004)	0.0084	0.4682
$ln(EUF_{it}+1) * se$	0.0025	(0.0026)	0.0014	1.8018
$ln(EUF_{it}+1) * si$	0.0013^{***}	(0.0003)	0.0072	0.1850
$ln(EUF_{it}+1) * sk$	0.0038^{***}	(0.0004)	0.0090	0.4209
$ln(EUF_{it}+1) * uk$	0.0045^{***}	(0.0012)	0.0014	3.1079
Observations	4,896			
R^2	0.957			
Regional FEs	Yes			
Time FEs	Yes			

Notes: Robust standard errors in parentheses. Significance: *p<0.1; **p<0.05; ***p<0.01.

Conclusions (1)

We revisit the effect of Cohesion Policy on regional growth, using the most recent and most comprehensive regional data set to date. To account for the likely endogeneity of Cohesion Policy transfers in economic performance, we use the density of Natura 2000 sites as an instrument.

Cohesion Policy transfers have a positive overall effect on growth. The effect becomes even stronger when controlling for endogeneity. OLS estimates are biased downwards, which can account for the insignificant effects in (some) previous studies.

Stronger impact of CP in the new member states.

Institutional quality also associated with faster regional growth. Convergence of less developed regions can be achieved by greater redistribution or by institutional change: $100 bills on the sidewalk.

Conclusions (2)

Inter-regional spillovers are important: CP effect may take place mainly in nearby regions rather than in the recipient region.

The effect of CP on regional output is positive but small: €1 of additional CP transfers raises regional output by €0.24 on average. This is only the contemporaneous own-region effect: further output gains are likely in the following years, and/or through inter-regional spillovers. Cf. Zawistowski et al. (2011): €1 of CP spending increases domestic output by 0.4 and imports by 0.6 in V4 countries.

There are substantial differences in the multiplier effects across countries. Moderate positive effects in large CP recipients, large positive or negative effects in some developed countries with modest CP receipts, and small negative or zero effects in countries affected by austerity during the GFC.

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