The European Structural and Investment Funds (ESIF) and the regional convergence

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The European Structural and Investment Funds (ESIF)

- Objective: To analyze the effects of the European Structural and Investment Funds (ESIF) on the **catching-up of the rural population income**.
- Theory: Economic models of migration point to the **search for higher incomes as the primary driver behind individual decisions** on interregional migrations.
- We hypothesize that the critical variable to explain the fall in population density in rural areas is the ***per capita*** **income-gap with urban areas** located in the most **dynamic regions.**
- The ESIF are provided explicitly with the target of **reducing economic disparities among regions**,
- We expect that in the case in which they are **correctly allocated**, they could **improve income in rural areas** and ultimately **prevent their depopulation**.

Highlights 1/ ESIF and the CAP

- Approximately **one-third of the EU budget is allocated to the ESIFs**, which, after the **Common Agricultural Policy** (CAP), represent the **second-largest community policy**.
- Due to the **enormous size of these funds and their macroeconomic importance**, numerous studies have investigated their impact on interregional convergence in Europe (see, among others, those of Ederveen et al., 2002, 2006; Rodríguez-Pose and Fratesi, U. 2002; 2004; Puigcerver-Peñalver, 2007; Becker et al., 2008; Becker et al., 2010, 2012; Boscá, et al., 2016).

Highlights 2/ ESIF and the business cycle

- The primary added value of this research is that it allows comparison of the results in terms of **convergence of two budgetary periods** covering **different phases of the economic cycle** and **two ESIF operational programs.**
- Results, using ex-post data of the **funds invest**, show that the **effects on the real convergence** of the regions were **different** after the recession that took place from 2007-13 (after the economic boost 2000-06)
- We use the available data for the periods 2000-06 and 2007-13

Highlights 3/ Public debt and spillovers

- **The level of indebtedness in the region has a definite adverse effect** on the **effectiveness** of European projects.
- Additionally, we identified **an apparent spillover effect** from the funds towards other border regions on those that are formally receiving.

Highlights 4/ Business Cycles and the ability of funds to contribute to the growth

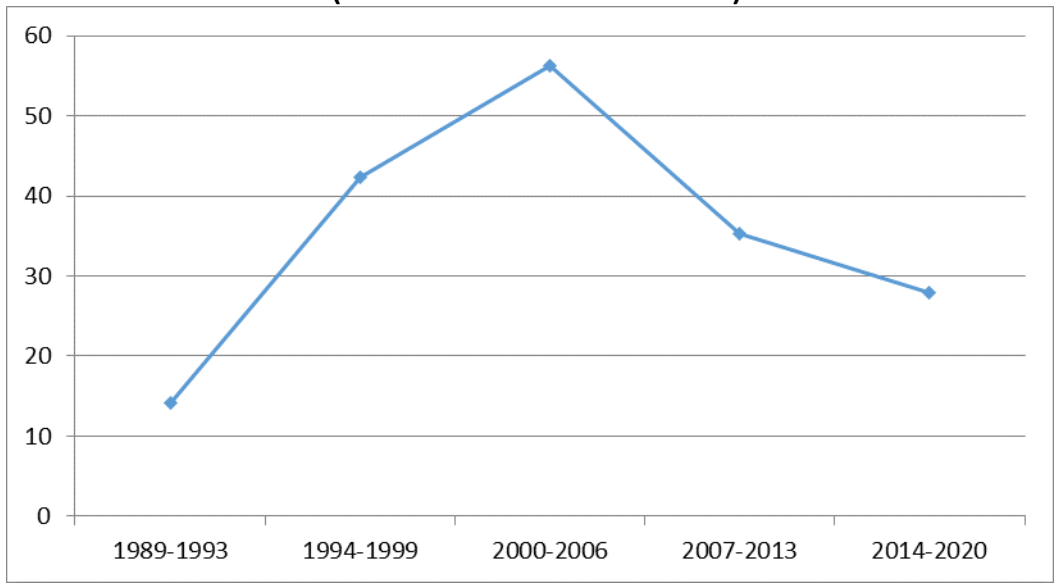
- Changes in economic **cycles seem to have a significant impact on the ability of funds to contribute to the growth** of the regional economy.
- Therefore it is essential to be able to **adapt the funds according to the phase of the business cycle**.
- Especially during the downturns, **to ensure their effectiveness.**
- The **anti-crisis fund budgeted** in the draft budget perspectives for the multi-annual 2021-27 could fulfill this function **as long as it reaches a sufficient volume to have significant effects**.

ESIF budget by multi-annual programs

Illustration 1

ESIF budget by multi-annual programs. Spain.

(thousands billions €)



The aid has not arrived uniformly, and in 2004, due to the **integration into the EU of the eastern** countries, the average per capita gross domestic product (GDP pc) of the European Union **decreased significantly** with the **enlargement** to the east and central European countries.

- Only those **regions whose GDP is less than 75%** of the EU average **receive funds Objective Convergence *(Objective 1)***
- Some regions do not qualify for Objective 1 Funds because, **after the enlargement** to the east, their **per capita income is now over the average EU.**
- This decrease in the average GDPpc affected the collection of funds for many Spanish regions,
- which saw their relative position exogenously improve concerning the EU gross domestic product,
- thus ***losing their status as less developed regions (Objective 1)*** and, with this, the intensity of aid.
- Available ESIF for Spain decreased significantly with the enlargement to the east and central European countries (2004).
- The ESIF reduction continues with ***the panic-driven austerity**** after 2011

* Paul De Grawe and Yuemai Ji (2013) From Panic-Driven Austerity to Symetric Macroeconomic Policies in the Eurozone. Journal of Common Markets Studies, 51 pp. 31-41

Table 1 Names of the ESIF according to the multi-annual program

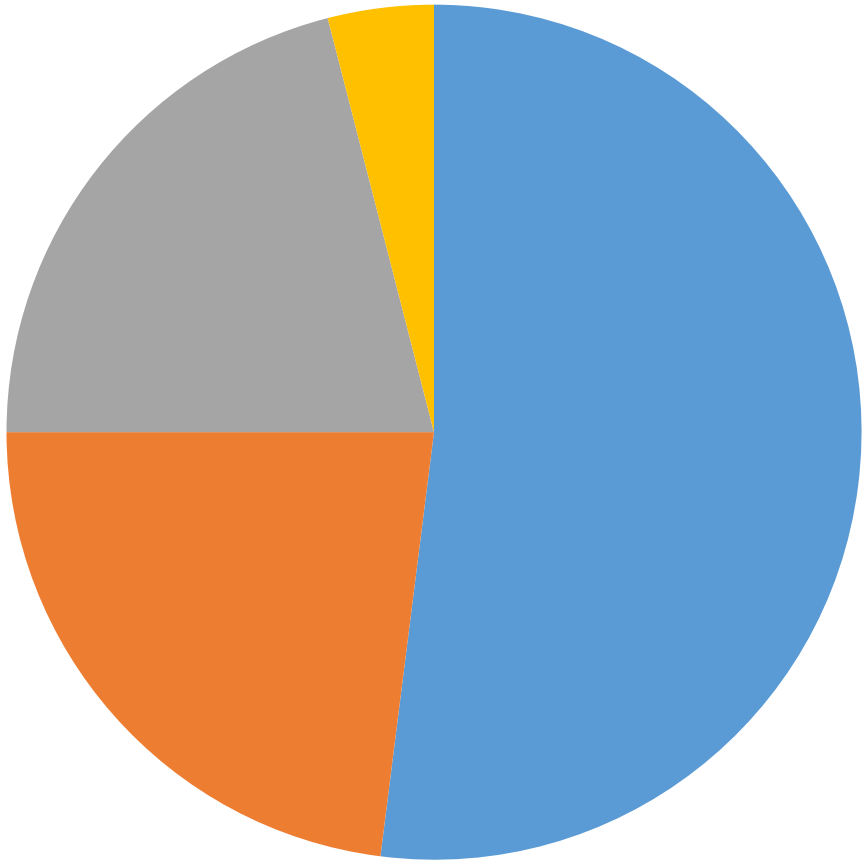
	ERDF	ESF	EAGGF	EFFFM
1989-1993	European Regional Development Fund **ERDF**	European Social Fund (**ESF**)	European Agricultural Guidance and Guarantee Fund (EAGGF)	Included in EAGGF
1994-1999	**ERDF**	**ESF**	**EAGGF**	Financial Instrument for Fisheries Guidance (**FIFG**)
2000-2006	**ERDF**	**ESF**	**EAGGF**	Financial Instrument for Fisheries Guidance (**FIFG**)
2007-2013	**ERDF**	**ESF**	**European Agricultural Fund for Rural Development** (**EAFRD**)	European Fisheries Fund
2014-2020	**ERDF**	**ESF**	**EAFRD**	European Fund for **Fisheries**, Fishing and Maritime

Note: The European **Agricultural Guidance and Guarantee Fund (EAGGF)** have been replaced by the **European Agricultural Fund for Rural Development (EAFRD)** and the Financial Instrument for Fisheries Guidance (FIFG) and the European Fisheries Fund are now the European Fund for Fisheries Fishing and Maritime

Source: Own elaboration

Relative size of the ESIF funds

Illustration 2



a) European Regional Development Fund : ERDF 52%

b) European Agricultural Fund for Rural Development EAFRD 23%

c) European Social Fund ESF 21%

d) European Fund for Fisheries, Fishing and Maritime EFFFM, 4%

ESIF and the Beta-Convergence hypothesis of the regional GDP *per capita*

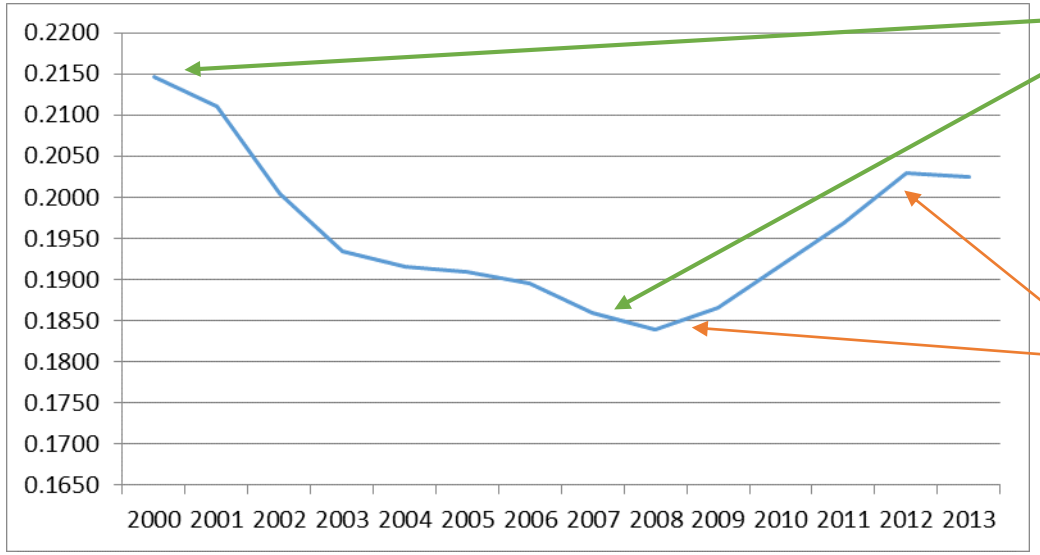
- However, the empirical results on the effectiveness of the ESIF to achieve real convergence are disparate according to the period under analysis in the available literature.
- **Beta-Convergence** hypothesis: regions with lower levels of per capita income tend to grow faster than the income leaders
- Will use the case of **Spain as a case study to test the Beta-Convergence** hypothesis of the regional GDP per capita (GDPpc) and test the role of the ESIF.

Theory: β-convergence versus σ-convergence

- The speed of convergence and whether it is transitory or permanent in nature plays an essential role in characterizing regional disparities in income
- Following Barro and Sala-i-Martin (1992; 1995) we say that there is:
- **β-convergence** if regions with lower levels of per capita income tend to grow faster than the income leaders, and
- **σ-convergence** if the dispersion of their relative per capita income levels tends to decrease over time.

Evolution of the Sigma convergence of the *ln GDPpc* by region

Illustration 3. Sigma convergence of the ln GDP pc by region

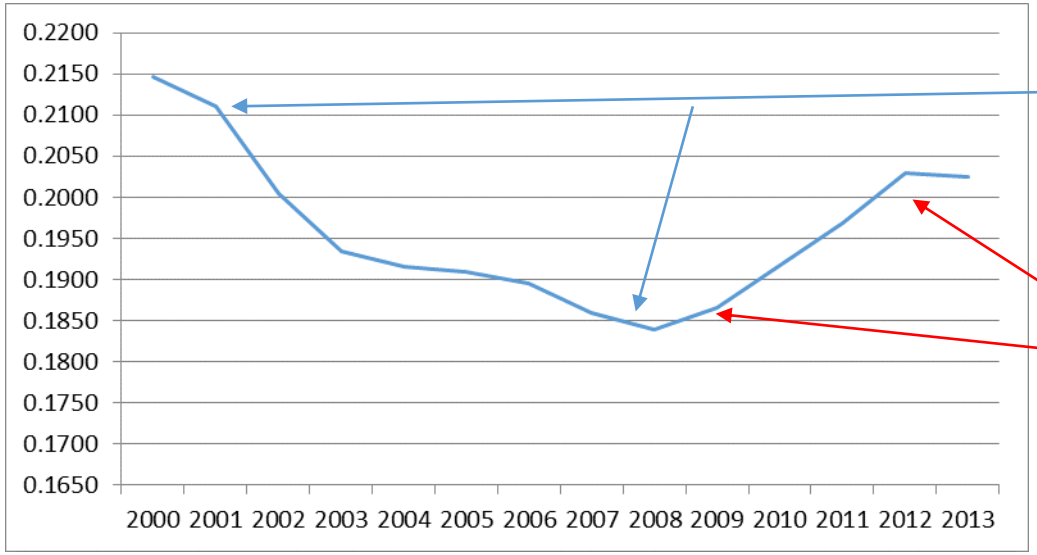


σ-convergence:

- σ-convergence **if the dispersion** of regional relative per capita income levels **tends to decrease** over time.
- Cyclical fluctuations in economic activity (financial crisis of 2008) that tend to **increase dispersion**.

Sigma convergence of the *per capita* GDP

Illustration 3 Sigma convergence of the *ln GDPpc*



σ-convergence:

- The empirical results shows:

1. convergence during the expansion
2. sigma **di**vergence during the recession (increase in the income variance)
3. Drivers of sigma **di**vergence?

Is disaggregating per capita GDP a way of searching for drivers of sigma divergence?

- Disaggregating **per capita GDP** into two components:

1. **income per worker Y/L**
2. percentage of working population (**L/n**)

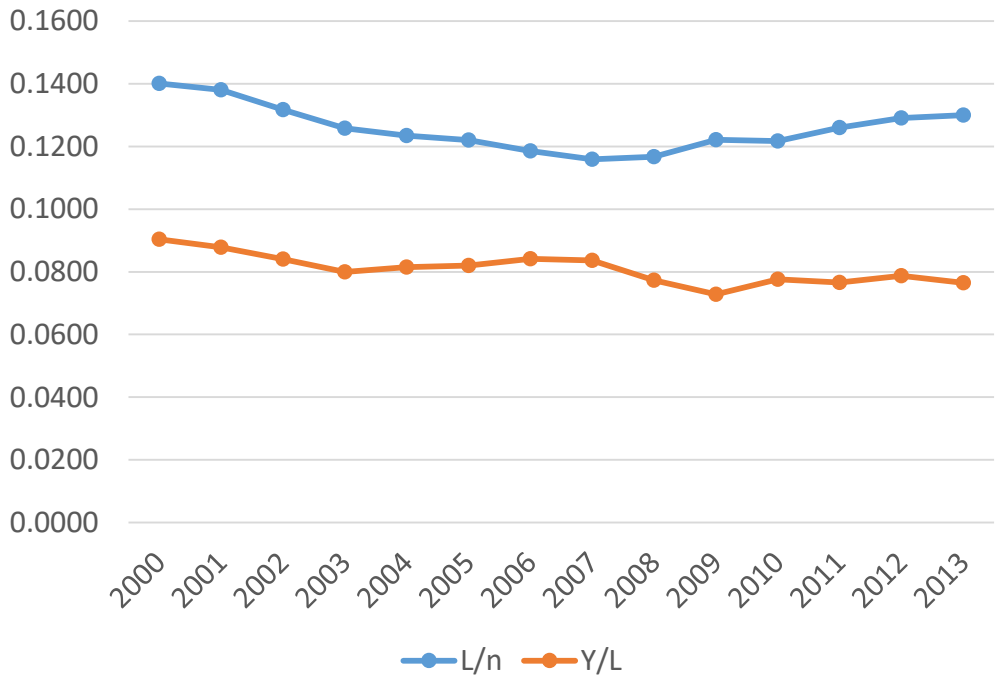
$$Y/n = Y/L * L/n \qquad \text{(Equation 1)}$$

(see next slide)

Sigma convergence disaggregated

Illustration 4

GDP sigma convergence disaggregated by working population by inhabitant versus income per worker



- We observe that although **the standard deviation of income per worker** has decreased throughout the period, **the standard deviation of the percentage of the employed population increased** since 2007.
- The latter indicates that the main engine of divergence for the post-recession period has been the **increase in the differences in the working population** between regions.
- Employment and depopulation are co-related in the rural areas, so **divergence in income per capita** regarding the urban areas may **decrease the working population in rural areas**.

β-convergence is a **necessary but not a sufficient condition** for σ-convergence

- It is well known that β-convergence is a **necessary but not a sufficient condition** for σ-convergence (Quah, 1993a, b).
- An important implication of this result is that income inequality across countries or regions **may persist due to shocks** (e.g., cyclical fluctuations in economic activity) **that tend to increase income dispersion**
- The later drives to study the conditional convergence of the regions.

Beta convergence and beta conditional convergence

- A second step to understand the problem is to analyze the β convergence.
- To do this in Table 2 Beta convergence and beta conditional convergence, using cross-section data the following regressions have been estimated:

$$g_{it} = \alpha + \beta * \ln(y_{i,t-1}) + u_{it} \qquad \text{Equation 4}$$

$$g_{it} = \alpha + \beta * \ln(y_{i,t-1}) + \sigma * k_h + u_{it} \qquad \text{Equation 5}$$

- Where:
- $\mathbf{g_{it}}$ represents the average per capita GDP growth rate in the period studied,
- $\mathbf{y_{i,t-1}}$ per capita GDP at the beginning of the period
- $\mathbf{k_h}$ human capital in Equation 5.
- The introduction of the human capital aims to control by the **rural brain drain** **but also is** about capturing **significant and exclusive characteristics of each region**.

β Convergence

Table 2 Beta convergence and beta conditional convergence

	β convergence (absolute)			β convergence (conditional)		
	2000-2013	2000-2007	2008-2013	2000-2013	2000-2007	2008-2013
$\ln(y_{i,t-1})$	-1.37	-2.56	0.902	-4.11	-6.44	2.08
	(0.79)	(-0.89)	(1.31)	(-3.91)	(-5.38)	(1.13)
kh				1.2	1.76	-0.41
				(3.09)	(3.83)	(0.7)
R^2	0.2	0.35	0.1	0.52	0.68	0.13

Our results confirm the hypothesis that **regional convergence has stopped after the financial crisis** and, during the fiscal austerity period, has reverted to divergence.

- While
- $g_{it} = \alpha + \beta * \ln(y_{i,t-1}) + u_{it}$ (Equation 4) tries to estimate absolute β convergence,
- $g_{it} = \alpha + \beta * \ln(y_{i,t-1}) + \sigma * k_h + u_{it}$ (Equation 5) assumes that **each region has its own stationary state**,
- and therefore, by including **human capital Kh** it is about capturing **significant and exclusive characteristics of each region** to find the **conditional β convergence.**

Beta convergence and recession

Table 2 Beta convergence and beta conditional convergence

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- In 2000-13 conditional convergence process of up to 4.11%
- In the period from 2000-07, a conditional convergence process of up to 6.44% is observed,
- while from 2008 to 2013, the β coefficient not only changed its sign to positive but also ceased to be significant
- and R^2 fell from 0, 68 to 0.13.
- **It can be concluded, therefore, that the 2008 financial crisis has hurt the Spanish regional convergence.**

Conditional convergence of the regions: β-convergence

- Do ESIFs have a significant impact on Spanish regional convergence in terms of per capita income?
- After rejecting the null hypothesis of the Hausman test about whether or not we could use an estimate using random effects, we used the **fixed-effect estimator** for Equation 2 of model 1.
- Most of the **signs of the coefficients are consistent with the predictions of the neoclassical growth model**, except for agriculture, although it is not statistically significant (See next Table 9 *Estimation of the model by fixed effects and with the inclusion of time delays*).

Table 9 Estimation of the model by fixed effects and with the inclusion of time delays.

	Current year		Lag1		Lag2		Lag3	
	Coefficient	**t**	**Coefficient**	**t**	**Coefficient**	**t**	**Coefficient**	t
GDP pc	-.410***	-7.91	-.437***	-8.12	-.403***	-7.31	-.386***	-7.25
ERDF	.016***	2.54	-.008	-1.35	-.003	-0.53	.004	0.73
EAFRD	.003	1.35	-.002	-0.80	-.004	-1.66	-.001	-0.69
Program	.016 ***	3.76	.017**	1.98	.009	1.09	-.007	-0.86
kh	.028***	2.88	.023***	3.11	.024	3.12	.0249	3.26
ip	.0341	3.34	.050	3.36	.055	3.69	.057	3.91
employ	.120	2.62	.115	2.49	.108	2.32	.112	2.42
n + g + δ	-.024	-1.35	-.028	-1.66	-.023	-1.29	-.032	-1.76
agr	.004	0.27	.003	0.37	.006	0.67	.008	0.96
constant	5.076	8.14	5.475	8.62	5.099	7.83	4.867	7.74
R^2 within	0.54		0.51		0.51		0.51	
F	20.90		18.64		18.03		18.24	
observations nº	237		237		236		235	
groups nº	17		17		17		17	
average observations	13.9		13.9		13.9		13.9	

- We also observe how the initial per capita GDP level negatively affects growth, which confirms that **conditional β convergence has occurred**.
- Specifically, **1% more in the per capita GDP** leads to **growth rates** of approximately **0.4% lower**.

In general terms, the regressions have an R^2 higher than fifty percent. Besides, the F statistic is close to 20, so the variables used can explain changes in per capita GDP growth.

Focusing on the ESIFs:

1. we find that while both the **ERDF [Regional]** expenditure executed and the budgeted expenditure of the funds as a whole have a **weakly positive but significant effect.**
2. On the other hand, the **EAFRD [Agricultural] is not significant.**

ESIF impact on the long run

- Also, when applying lags in the estimates, both ERDF and EAFRD **change sign and cease to be significant**.
- These results are consistent with those offered by (Rodríguez-Pose and Fratesi, 2002, 2004; Rodriguez-Pose, A., and Garcilazo, E. (2013), which also conclude that **the funds affect in the short term but not in the long run.**
- **The later would mean that the funds have a purely redistributive effect, not structural**.
- These findings coincide with (Becker et al., 2010) who also find that **the impact of the funds disappear when** certain regions of the United Kingdom **stop receiving them.**

Spillover effects of the ESIF

- Next, extending the model to observe if there are **spillover effects** of the ESIF, in particular of the ERDF [Regional] , **from the receiving region to other border regions.**
- In fact, in Table 5 Estimation of the spillover model and public debt, when interacting this variable with the ERDF variable, the result is a positive and significant coefficient, which implies that **a percentage of the aid to the regions Objective 1 ends up having positive effects in other regions.**

Indebtedness in the region

- The level of indebtedness in the region, measured as the percentage of public debt to GDP, **has some impact on the ability to attract investments through projects co-financed** by ESIFs in the region.
- $\frac{\partial l\ Growth}{\partial l\ ERDF} = \boldsymbol{\beta_2} + \boldsymbol{\beta_{11}} * \boldsymbol{debt} \quad (Equation\ 4)$
- The coefficient turns out to be negative and significant, so the conclusion is that the **impact of ESIFs on regional growth is no longer linear and will depend negatively on the degree of public debt** held by the Autonomous Regions

Table 5

Estimation of the spillover model and public debt

Variable Dependiente: ln (crecimiento PIB pc)				
Independents Variables	Coefficient	t	Coefficient	t
GDP pc	-.473	-8.99	-.407	-7.50
ERDF	.005	1.42	.007	2.65
kh	.029	3.89	.029	3.17
ip	.042	2.98	.049	3.47
empleo	.150	3.42	.079	1.65
n + g + δ	-.023	-1.37	-.021	-1.20
agr	.0005	0.07	.009	1.02
spillover	**.095**	**1.35**		
spillover*ERDF	**.041**	**2.97**		
Debt			.244	1.97
Debt*Founds			**-.061**	**-2.39**
Constant	5.97	9.60	5.07	8.20
R2 within	0.54		0.52	
F	22.94		20.73	
nº observations	237		237	
nº groups	17		17	
Average observations	13.9		13.9	

Conclusions: Public debt and spillovers

- Besides, we verify the importance of other factors generally ignored in the literature, such as regional public debt and spillovers.
- **The level of indebtedness in the region has a definite adverse effect** on the **effectiveness** of European projects.
- Additionally, we identified **a clear spillover effect** from the funds towards other border regions on those that are formally receiving.
- Therefore, our analysis suggests that structural funds **function more as a redistributive policy than as a structural policy,**

Cycles and the ability of funds to contribute to the growth

- On the other hand, changes in economic **cycles seem to have a significant impact on the ability of funds to contribute to the growth** of the regional economy.
- Therefore it is essential to be able to **adapt the funds according to the phase of the business cycle**,
- Especially during the downturns, **to ensure their effectiveness.**
- The **anti-crisis fund budgeted** in the draft budget perspectives for the horizon 2021-27 could fulfill this function **as long as it reaches a sufficient volume to have significant effects**.

Part of the ESIF were no executed

- Besides, reductions in public spending have had a double adverse effect:

1. It is money that was **not invested** since the project was not applied for **due to the lack of available budget to co-finance it.**
2. The later, also implies, according to the European Union principle of additionality, that **part of the ESIF funds were not allocated** at the **critical moment** of the great recession.

- As a consequence, the **potential effectiveness of ESIFs to boost real convergence** has been **severely deteriorated**

Structural problems

- As (Bonatti and Fracasso, 2017 pp. 35-36) point out, part of **the problems of the peripheral regions are structural**, and this should be the objective of the **ESIF to solve the structural issues.**
- However, during the recession, the backward regions have also suffered the consequences of European austerity policies,
- so they could also recover the lost ground in real convergence if there were a fiscal expansion in the future.
- The latter is consistent with the position of Blanchard et al. (2013, 2017), which maintain that **the multiplier of public spending grows during recessions**, and
- who also underscore how the **liquidity trap in the periphery of the Eurozone could improve the effectiveness of an external fiscal stimulus**.

Thank you for your attention

Questions?

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Data at the EU level regarding Objective 1 regions

It is straightforward to notice that regions **non treated** as Objective 1 present:

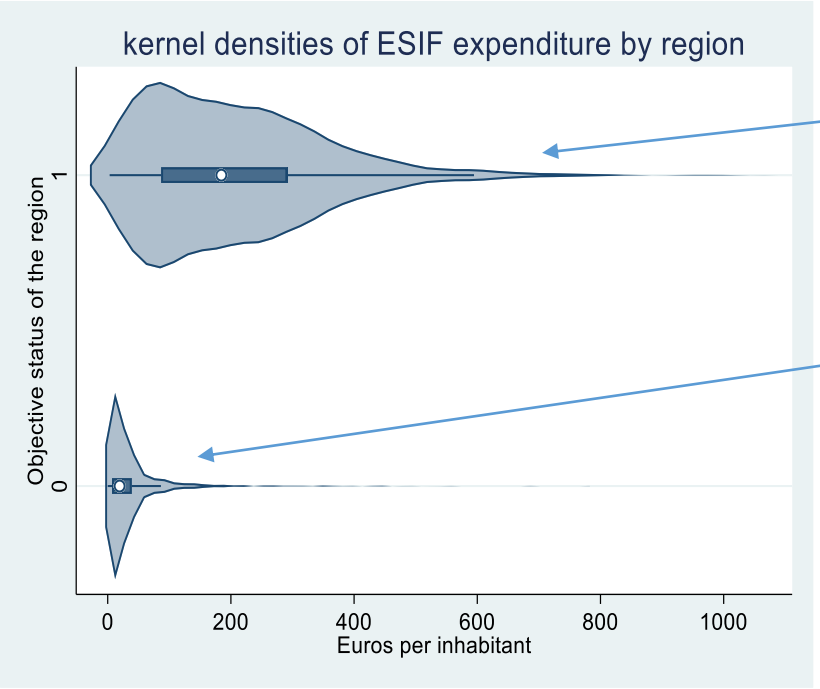
1. higher levels of income (Figure 2) and investment,
2. better regional governments and
3. considerably more employment and population densities.

On the other hand, **Objective 1 regions:**

1. the differences with the rest of regions are **related with the productive structure,** among other reasons.
   a) whereas **Objective 1 recipients have a 12% of the active population** engaged in activities linked to **agriculture**,
   b) other regions barely show a 3%.
2. **Objective 1 regions has** a slightly **lower level of educational attainment.**

ESIF kermel densities expenditure by type of EU region

Figure 1

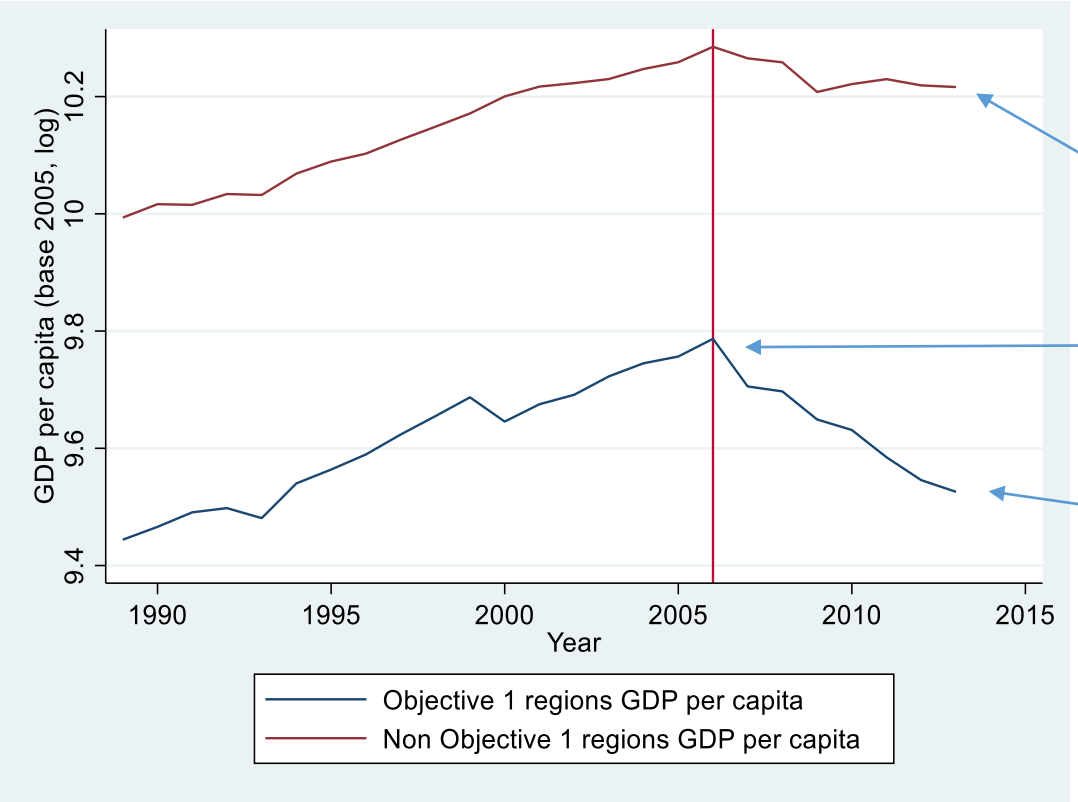


3. **Objective 1 regions receive** almost **three times more funds** than the rest of the regions (for the whole distribution, see **Figure 1**).
4. Non-objective 1 regions receive less ESIF funds

Fuente: Sunyer, C. 2019

GDPpc in Objective 1 regions versus others

Figure 2

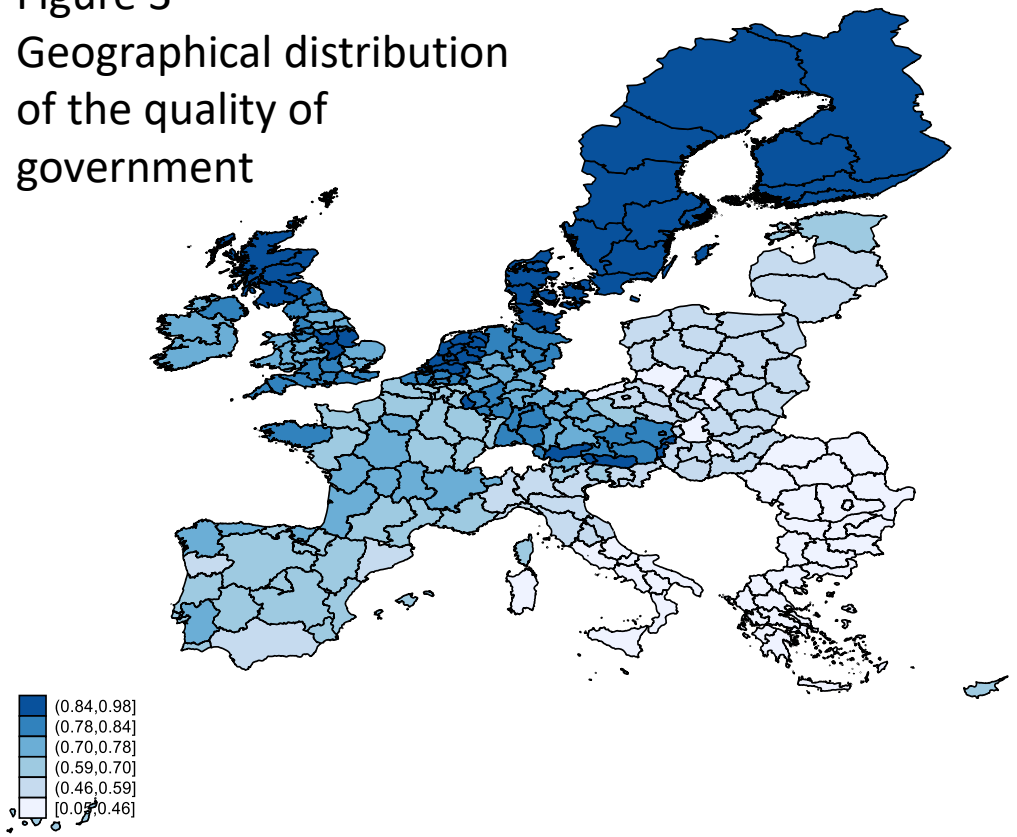


It is straightforward to notice that regions **non-treated** as Objective 1 present:

- 1.higher levels of income (Figure 2) and investment
- 2. Since Objective 1 regions, by definition have lower GDPpc
- 3. Moreover, they have been more harmed by the financial crisis.
- Source: Sunyer, C. 2019

Geographic distribution of the quality of government

Figure 3
Geographical distribution of the quality of government



- Objective 1 regions shows lower index of quality of government

Arguments for a regional policy/1

- Intervention to reduce economic disparities is justified:
- If the theoretical conditions for a β convergence do not hold (e.g. the marginal product of the capital do not decrease → ENDOGENOUS GROWTH; no labour mobility)
- If the steady state of convergence for the different regions is not the same (in case that s, δ, o f(k) are different —> conditional β-convergence, no absolute)
- If the empirical speed of convergence is considered insufficient: Empirical speed: β = 2% (annual growth reduces the gap between current GDP and steady state by 2%) => it takes 35 years to reduce (y* — y) by one half (Barro/Sala-i-Martin)

Arguments for a regional policy/2

Economic integration and convergence, **neoclassical theory**:

- Specialization in comparative advantage products,
- Equalization of the factor of production prices (wage and profit rate),
- **Technology transfer, FDI, etc. => economic integration accelerates convergence, regional policy less needed**

Arguments for a regional policy/3

New economic geography:

Aims to explain the geographical distribution of the economic activity

- **Initial situation:** concentration of the regional activity (for historical reasons, the natural condition of the place, …)
- Scale economies: location advantages in the neighborhood of the market and other companies

⇒ companies are attracted to the "center"

⇒factors demand increases, lower output prices,

⇒immigration attracted

⇒increasing market size

⇒more companies are attracted to the "center"

Arguments for a regional policy/4

Economic integration decreases the trade cost:

- proximity to the market become less important ->Market forces for regional dispersion
- Without labor mobility: wages increases in the center
- Immobility of certain production factors (land, natural resources, water,…)
- Companies move searching lower production factors (periphery)
- Decreasing economic differences between countries

Arguments for a regional policy/5

- **Limiting forces to the regional dispersion:**
- Low wages flexibility: If the wages are negotiated in a centralized way

=> the periphery advantage disappears

- Certain companies do not have incentives to abandon the center.

=>Regional differences increases over time