Cohesion or illusion?
Losing funds and European sentiment

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1 Introduction

In 2004, ten countries joined the European Union[1]. This enlargement integrated over 74 million new citizens, increasing the EU's population by 20%. The newly acceded countries gained access to EU regional policy, benefiting from €22 billion in funding between 2004 and 2006, equivalent to 10% of the total regional policy budget for the 2000–2006 programming period[2]. Over time, these countries secured even greater financial support, with some of their regions becoming the most heavily funded.

The accession of these new member states led to a reduction in average per capita GDP across the EU, which in turn resulted in decreased funding for regions in the existing member states. This redistribution of resources may have had unintended consequences: as EU citizens saw funding shift towards the new member states, they may have perceived it as a loss, potentially leading to a decline in support for the EU. This reaction could have played a role in growing dissatisfaction towards the EU. Understanding whether such a dynamic exists is crucial, as it would suggest

[1]Czechia, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia.

[2]`https://ec.europa.eu/regional_policy/policy/what/history_en`.

that EU enlargement itself may have been one of the factors behind rising Euroscepticism.

The objective of this paper is to examine whether losing access to EU funding leads to a decline in public support for the EU. This analysis exploits changes in the European Regional Development Fund (ERDF) convergence objective across different programming periods[3].

To investigate this, the paper applies the novel Synthetic Difference-in-Differences methodology proposed by Arkhangelsky et al. (2021). The findings suggest that losing access to EU funds negatively affects public opinion towards the EU, as reflected in national election results. However, the results are not robust enough to draw definitive conclusions, highlighting the need for further research.

2 Literature review

The literature on Euroscepticism highlights the role of economic insecurity and immigration in shaping public support for the EU. Studies show that immigration increases support for right-wing parties and protest votes (Barone et al. (2016); Halla et al. (2017)), while rising unemployment fuels distrust in the EU and mainstream institutions (Algan et al. (2017)). Additionally, economic insecurity drives demand for populist policies, particularly in crisis-hit countries (Guiso et al. (2017)). Research on EU Cohesion Policy and voting behavior suggests that while EU funds do not directly boost pro-EU sentiment, they help mitigate Euroscepticism by improving labor markets (Crescenzi et al. (2020)) and reducing support for anti-EU parties (Borin et al. (2021); Rodríguez-Pose and Dijkstra (2021)). However, the impact varies: EU funds had no clear effect on the Brexit vote (Becker et al. (2017)) but did reduce support for Marine Le Pen in France (Bachtrögler and Oberhofer (2018)).

Less is known about the consequences of losing EU funding. Evidence suggests mixed economic effects, with South Yorkshire experiencing a decline after losing support (Di Cataldo (2017)) and only regions facing major cuts during recessions suffering economic downturns (Cerqua and Pellegrini (2023)).

[3]Losing the ERDF convergence objective does not imply a complete loss of EU funding but generally results in a reduction in total funds received.

To our knowledge, this paper is the first to investigate how losing EU funding impacts public sentiment toward the EU.

3 Data

3.1 The EU cohesion policy

The EU regional policy is the European Union's primary investment policy, accounting for nearly one-third of the EU budget. The main component of this policy is the European Regional Development Fund. According to ERDF, European regions are classified into three categories:

- Less developed regions: GDP per capita is less than 75% of the EU average.
- Transition regions: GDP per capita is between 75% and 90% of the EU average.
- More developed regions: GDP per capita is above 90% of the EU average.

Funding is primarily directed toward less developed regions. According to official documents from the 2014–2020 programming period, 50% of total resources were allocated to less developed regions, 10% to transition regions, and just over 15% to more developed regions.

Changes in regional classifications can partly be attributed to shifts in the GDP eligibility threshold, influenced by the inclusion of poorer regions following EU enlargement. As illustrated in Figure 1, the distribution of GDP per capita differs significantly between EU15 (regions that were part of the EU before the 2004 enlargement) and EU2004 (all regions in the EU after the enlargement). The figure highlights how enlargement lowered the overall GDP per capita distribution, thereby reducing the GDP threshold for ERDF eligibility. Before the enlargement, the 75% eligibility threshold stood at €23,661, whereas post-enlargement, it dropped to €21,024, representing a decline of approximately €2,600 per capita.

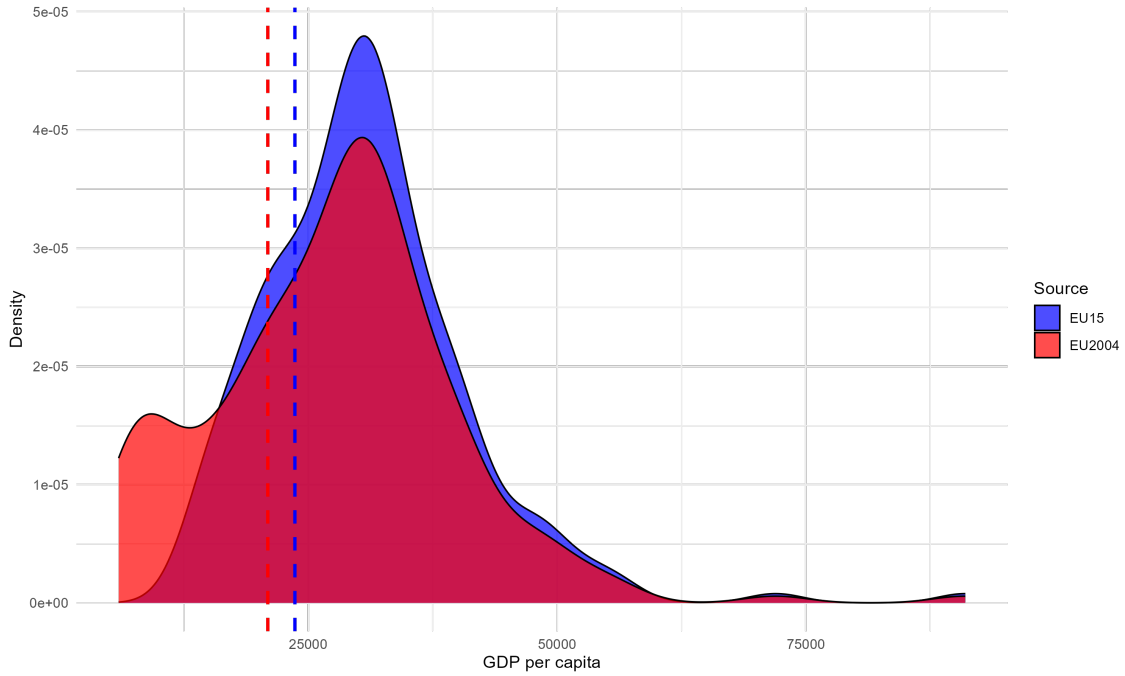


Figure 1: GDP distribution in 2004: EU15 vs. EU2004

Data on EU payments are sourced from Historic EU payments – regionalised and modelled[4], which compiles all payments across EU funds from 1989 to 2020. Tables 2 and 3 in the Appendix list the regions that lost their less developed status, along with their yearly per capita funding and the percentage change in total funds received compared to the previous programming period.

Does losing Less Developed status lead to a decline in funds? The answer is both yes and no. While a region's ERDF eligibility is determined based on its GDP per capita, the total amount of EU funding it receives is the sum of five different funds. Interestingly, some regions that lost less developed status still experienced a significant increase in funding. This occurs primarily in two cases: regions that joined the EU in the previous programming period and did not yet receive full support and regions in Sweden and Finland included even if they didn't respect the 75% rule. To ensure a more accurate analysis, these special cases will be excluded, leaving only regions that appear "ordinary" in their funding patterns. However, even among these regions, some still show an increase in funds despite losing the convergence objective.

[4] `https://cohesiondata.ec.europa.eu/Other/Historic-EU-payments-regionalised-and-modelled/tc55-7ysv/about_data.`

3.2 Elections and EU sentiment

To measure European sentiment, we combine national parliamentary elections with the Chapel Hill Expert Survey[5]. EU sentiment score is assigned to every region for every election in this way:

$$EUScore_{i,t} = \sum_{p} Voteshare_{p,i,t} * EUposition_{p,t},$$

where $EU_{i,t}$ is the EU sentiment score for region i in year t, $Voteshare_{p,i,t}$ is the share of votes that party p achieved in region i in year t and $EUposition_{p,t}$ is the position towards the EU of party p in year t.

This way of measuring EU sentiment allows for a comparison between countries that have different political landscapes, also allowing the same party to change position during the years.

EUposition measures overall orientation of the party leadership towards European integration measured from 1999 to 2019, where a value of 1 means "Strongly opposed" and a value of 7 means "Strongly in favor".

4 Methodology

For the main analysis we use the Synthetic Difference-in-Differences (SDID) proposed in Arkhangelsky et al. (2021). The SDID estimator used is the following:

$$(\hat{\tau}^{\text{sdid}}, \hat{\mu}, \hat{\alpha}, \hat{\beta}) = \arg\min_{\tau,\mu,\alpha,\beta} \left\{ \sum_{i=1}^{N} \sum_{t=1}^{T} (Y_{it} - \mu - \alpha_i - \beta_t - W_{it}\tau)^2 \hat{\omega}_i^{\text{sdid}} \hat{\lambda}_t^{\text{sdid}} \right\},$$

where τ is the average causal effect of exposure, i is the index for the NUTS2 regions, t is the index for the years, Y_{it} is the outcome variable (EU support) for region i in year t, W_{it} is a dummy taking value 1 if the region lost the convergence objective and 0 otherwise, $\hat{\omega}_i^{\text{sdid}}$ are weights that align pre-exposure trends in the outcome of unexposed units with those for the exposed units, $\hat{\lambda}_t^{\text{sdid}}$ are time weights that balance pre-exposure time periods with postexposure ones, μ is a constant term and α_i and β_t are unit and time fixed effects.

[5]The Chapel Hill expert surveys estimate party positioning on European integration, ideology and policy issues for national parties in a variety of European countries. The first survey was conducted in 1999, with subsequent waves in 2002, 2006, 2010, 2014, 2019.

Unit weights[6] are designed so that the average outcome for the treated units is approximately parallel to the weighted average for control units. Time weights[7] are designed so that the average post-treatment outcome for each of the control units differs by a constant from the weighted average of the pretreatment outcomes for the same control units.

The Synthetic Difference-in-Differences (SDID) estimator offers several advantages over methods like Difference-in-Differences (DID) and Synthetic Control (SC):

1. Addressing Parallel Trends Assumption: SDID constructs a synthetic control that ensures that the trends in the synthetic control and treatment group are parallel over time. This is crucial because in many real-world scenarios, the assumption of parallel trends required by DID may not hold.

2. Flexibility in Trend Matching: unlike SC, which aims to perfectly match the level of the treatment group, SDID focuses on matching the trend. This is beneficial in a situation like this, where the treatment and control units have different initial levels but similar trends over time.

3. Accounting for Unit Fixed Effects: unlike SC, SDID incorporates unit fixed effects, which helps in controlling for time-invariant differences between units.

4. Time Weights: unlike the SC, SDID also allows for the use of time weights, which can give more weight to periods that are considered more relevant or similar to the post-treatment period.

I also condition on covariates, in particular I use Funds per capita received, GDP per capita, unemployment rate and the migration rate. In the SDID conception, covariate adjustment is viewed as a pre-processing task, which removes the impact

[6]Unit weights are calculated as follows

$$\left(\hat{\omega}_0, \hat{\omega}^{sdid}\right) = \arg\min_{\omega_0 \in \mathbb{R}, \omega \in \Omega} \sum_{t=1}^{T_{pre}} \left(\omega_0 + \sum_{i=1}^{N_{co}} \omega_i Y_{it} - \frac{1}{N_{tr}} \sum_{i=N_{co}+1}^{N} Y_{it}\right)^2 + \zeta^2 T_{pre} \|\omega\|_2^2,$$

[7]Time weights are calculated as follows

$$\left(\hat{\lambda}_0, \hat{\lambda}^{sdid}\right) = \arg\min_{\lambda_0 \in \mathbb{R}, \lambda \in \Lambda} \sum_{i=1}^{N_{co}} \left(\lambda_0 + \sum_{t=1}^{T_{pre}} \lambda_t Y_{it} - \frac{1}{T_{post}} \sum_{t=T_{pre}+1}^{T} Y_{it}\right)^2 + \zeta^2 N_{co} \|\lambda\|^2.$$

of changes in covariates from the outcome Y_{it} prior to calculating the synthetic control.

5 Results

5.1 Defining Treatment and Control groups

Treatment and control groups are built as follows: for any programming period, a region is assigned in the treatment group if it lost the convergence objective in that programming period and it is assigned in the control group either if it has always been treated or it gained the treatment status sometime[8]. Regions that are never in the converge objective status or that lost the converge objective status in the previous programming period are excluded from both groups.
Figure 2 shows the map of treatment and control regions in the 2000-2006 Programming Period.

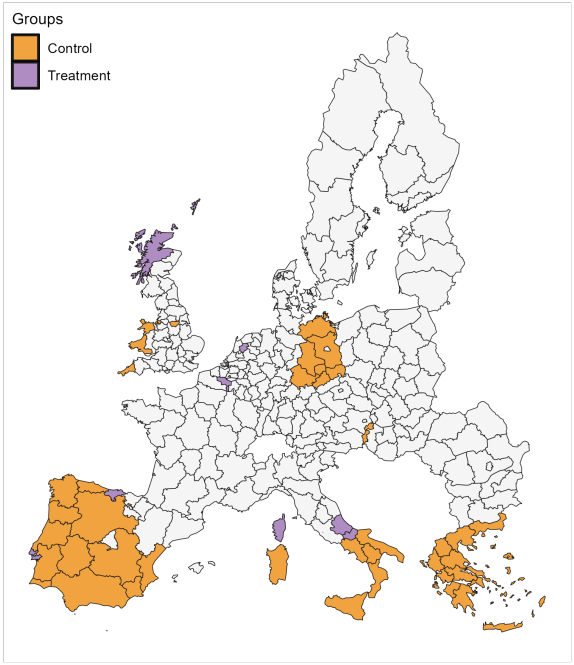


Figure 2: Treatment and Control groups: 2000-2006

[8]It should be noted that the division explained above is not perfectly respected. For the programming period 2000-2006, the 2004 enlargement regions are excluded, as they got treated only for a short time. Also the regions in Sweden and Finland will be excluded because they should have not been treated in the first place as discussed above.

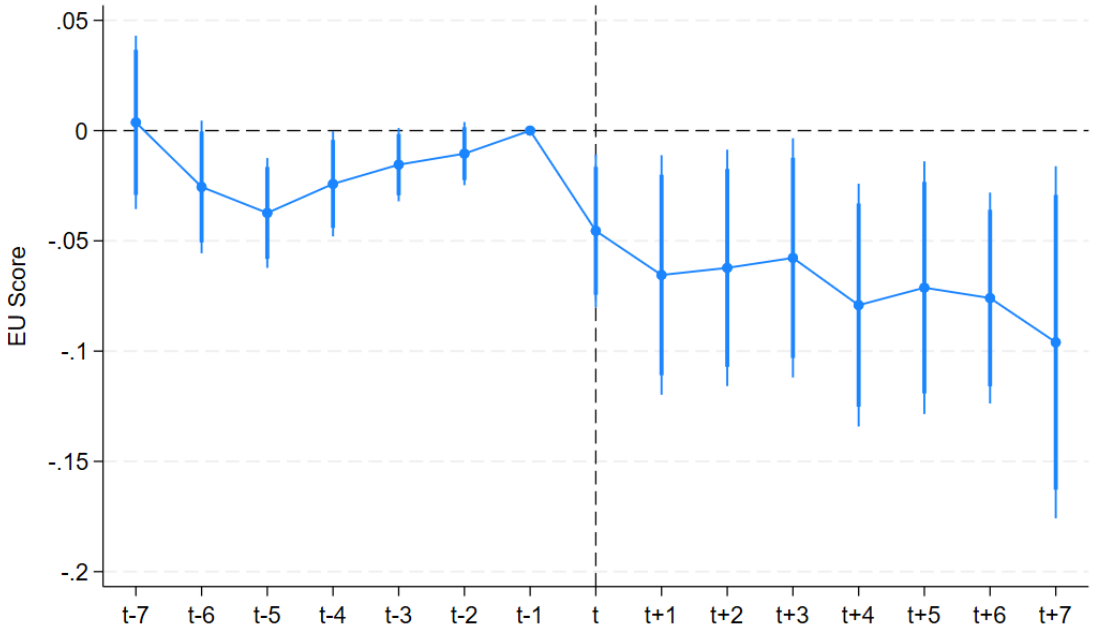
5.2 Event Study

Before presenting the SDID result, we show an Event Study visualization. The equation estimated (Cunningham (2021)) is the following:

$$Y_{it} = \sum_{\tau=-q}^{-1} \gamma_\tau D_{i\tau} + \sum_{\tau=0}^{m} \delta_\tau D_{i\tau} + \iota_i + \theta_t + X_{it} + \epsilon_{it},$$

where Y_{it} is the dependent variable $EUScore$, ι_i and θ_t are unit and time fixed effects, treatment (losing convergence objective) occurs in year 0 and there are q leads or anticipatory effects and m lags or post-treatment effects, X_{it} are the covariates and ϵ_{it} is the error term. I included the full set of dummies for pre-treatment and treatment years up to 20 years, the maximum possible window.

Figure 3 shows 7 years before the loss of the convergence status and 7 years after it, in order to show what happens in two programming periods around that moment, one in which the region is supported and the other not. Here we use the full sample considering all the programming periods from 1994 to 2020.



Note: t represents the year in which the convergence status is lost. The blue bars represent 90% and 95% confidence intervals.

Figure 3: Event Study

The estimates point to the fact that EU Score is decreasing after losing convergence

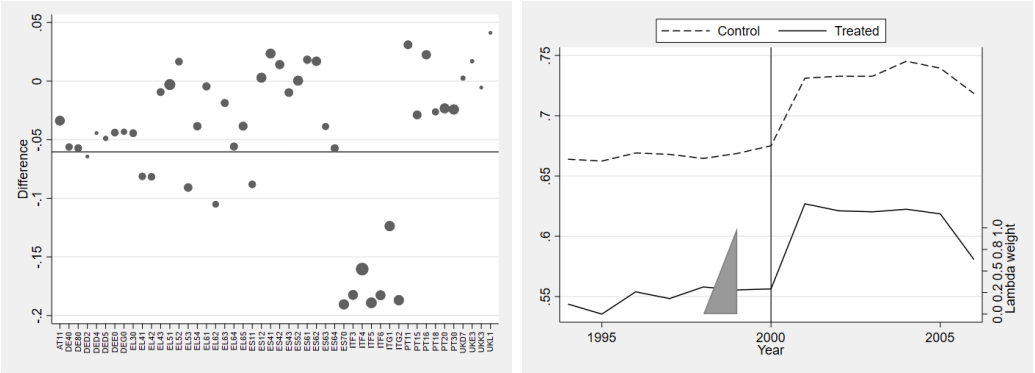
status, and this decrease looks greater as time goes by. Still there is a problem of non-parallel trend in the pre-treatment period that needs to be tackled.

5.3 Synthetic Difference-in-Differences

Table 1 and Figure 4 report the preliminary results of the Synthetic Difference-in-Differences for the 2000-2006 Programming Period. As it can be noted, losing convergence objective results in a decrease in EU support with respect to those regions that kept funds and the ATT estimate is negative and statistically significant.

Table 1: SDID estimate: 2000-2006

EU Score	**ATT**	**Std. Err.**	**t**	**P > |t|**	**95% Conf.**	**Interval**
Treatment	-0.06041	0.02482	-2.43	0.015	-0.10905	-0.01176



(a) Unit-Specific Weights (b) Outcome Trends and Time Weights

Figure 4: Synth Diff-in-Diff plot: 2000-2006

This result implies that economic consequences of losing funds are not driving preferences towards the EU: in Cerqua and Pellegrini (2023), they show that the loss of convergence status impacts GDP only if it is associated with an economic crisis and this was true only for the period 2007-2013. Given that in the period 2000-2006 there was no crisis, this decrease in European sentiment can't be caused by a lower economic performance due to lower funding.

6 Conclusion

The 2004 EU enlargement brought nearly 75 million new citizens into the Union, granting them access to substantial financial support. This expansion reshaped the GDP distribution across European regions, leading some previously disadvantaged regions to experience a reduction in funding.

This paper examines whether losing convergence status affects public sentiment toward the EU. The findings suggest that a loss in funding is associated with decreased support for the EU, particularly in the period around the 2004 enlargement. This indicates that regions that saw their funding redirected to new member states may have responded with a decline in European sentiment.

These results imply that EU enlargement may have unintended drawbacks for existing members, particularly those that lose financial support. However, the findings remain preliminary and require further investigation.

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A Appendix

Table 2: Regions that lost funds: funds received and difference from previous period (2000-2013).

Programming Period	NUTS2 ID	NUTS2 Name	Annual €pc	% Difference
2000-2006	BE32	Prov. Hainaut	35.12	-17.54
2000-2006	ES13	Cantabria	130.99	39.84
2000-2006	FR83	Corse	50.43	-24.27
2000-2006	ITF1	Abruzzo	23.05	-39.12
2000-2006	ITF2	Molise	64.28	-46.01
2000-2006	NL23	Flevoland	28.04	-2.18
2000-2006	PT17	Lisboa	83.12	10.64
2000-2006	UKM6	Highlands and Islands	72.20	56.57
2007-2013	AT11	Burgenland	123.18	50.39
2007-2013	CZ01	Praha	100.01	584.07
2007-2013	DED5	Leipzig	94.79	-0.03
2007-2013	EL30	Attiki	83.97	-14.40
2007-2013	EL42	Notio Aigaio	173.79	-13.41
2007-2013	EL52	Kentriki Makedonia	79.12	-25.95
2007-2013	EL53	Dytiki Makedonia	225.50	-11.59
2007-2013	EL64	Sterea Ellada	242.21	0.84
2007-2013	ES12	Principado de Asturias	97.97	-35.76
2007-2013	ES41	Castilla y León	72.16	-51.95
2007-2013	ES52	Comunidad Valenciana	54.38	-31.31
2007-2013	ES62	Región de Murcia	107.98	10.39
2007-2013	ES63	Ciudad Autónoma de Ceuta	368.73	-20.54
2007-2013	ES64	Ciudad Autónoma de Melilla	259.07	-35.94
2007-2013	ES70	Canarias	62.77	-36.90
2007-2013	FI1D	Pohjois- ja Itä-Suomi	107.15	88.42
2007-2013	HU10	Közép-Magyarország	134.69	525.05
2007-2013	ITF5	Basilicata	96.80	-41.59
2007-2013	ITG2	Sardegna	61.83	-42.88
2007-2013	PT15	Algarve	194.75	-16.60
2007-2013	PT30	Região Autónoma da Madeira	205.43	-39.86
2007-2013	SE31	Norra Mellansverige	44.75	23.61
2007-2013	SE32	Mellersta Norrland	80.92	72.66
2007-2013	SE33	Övre Norrland	65.17	-8.77
2007-2013	SK01	Bratislavský kraj	182.52	792.61
2007-2013	UKD7	Merseyside	35.80	-50.66
2007-2013	UKE3	South Yorkshire	30.14	-60.35

Table 3: Regions that lost funds: funds received and difference from previous period (2014-2020).

Programming Period	NUTS2 ID	NUTS2 Name	Annual €pc	% Difference
2014-2020	DE40	Brandenburg	40.77	-60.16
2014-2020	DE80	Mecklenburg-Vorpommern	108.96	-12.76
2014-2020	DED2	Dresden	40.01	-57.30
2014-2020	DED4	Chemnitz	39.54	-56.81
2014-2020	DEE0	Sachsen-Anhalt	113.66	2.42
2014-2020	DEG0	Thüringen	96.98	-9.30
2014-2020	EL41	Voreio Aigaio	317.15	13.78
2014-2020	EL43	Kriti	268.13	20.74
2014-2020	EL62	Ionia Nisia	294.74	-13.30
2014-2020	EL65	Peloponnisos	256.58	-27.02
2014-2020	ES11	Galicia	106.00	-23.68
2014-2020	ES42	Castilla-La Mancha	143.55	21.85
2014-2020	ES61	Andalucía	102.25	-16.17
2014-2020	PL12	Mazowieckie	147.01	-15.26
2014-2020	RO32	Bucureşti - Ilfov	130.35	62.10