

THE IMPACT OF COHESION POLICY (2014–2020) ON ECONOMIC GROWTH IN PORTUGAL

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Abstract

This paper investigates the impact of the 2014–2020 EU Cohesion Policy on regional economic growth in Portugal. Using a difference-in-differences approach combined with an event study framework, we exploit the variation in treatment across NUTS II regions to estimate both average and dynamic treatment effects on GDP per capita. The analysis reveals that treated regions experienced a statistically significant and economically meaningful increase in GDP per capita relative to control regions, with effects intensifying over time. Robustness checks—including placebo tests, exclusion of structural distinct regions, and specifications with relevant socioeconomic controls—support the validity of the identification strategy and the stability of the results. These findings contribute to the literature on EU regional policy effectiveness and underscore the role of targeted public investment in promoting economic convergence within member states.

1 Introduction

The European Union’s Cohesion Policy is one of the most ambitious and far-reaching redistributive policies globally, aimed at fostering economic, social, and territorial cohesion among Member States. Enshrined in Article 174 of the Treaty on the Functioning of the European Union (TFEU), the policy seeks to reduce disparities between regions by promoting balanced development and supporting structural reforms in less developed areas (European Commission, 2020). Its origins can be traced to the Treaty of Rome (1957), which acknowledged the need for balanced economic growth, but it was only with the creation of the European Regional Development Fund (ERDF) in 1975 that a tangible financial mechanism was established to support this objective (Wilson, 1980; Dinan, 2005).

Over the decades, Cohesion Policy has evolved through significant milestones. The Single European Act (1986) formally incorporated economic and social cohesion as key objectives, which were later reinforced through the Maastricht Treaty (1992) and the introduction of the Cohesion Fund (CF), targeting major transport and environmental projects in countries with lower Gross National Income (Christophersen, 1994). Subsequent reforms, particularly Agenda 2000 and the Lisbon Treaty (2007), expanded the policy’s scope to include territorial cohesion and introduced new instruments and governance frameworks (Radzyner, A. et al, 2014).

The 2014–2020 programming period built on these developments, aligning with the Europe 2020 Strategy and emphasizing smart, sustainable, and inclusive growth. Funding was delivered through three main instruments: the ERDF, the European Social Fund Plus (ESF+), and the Cohesion Fund. These instruments supported a wide array of initiatives, including infrastructure development, SME competitiveness, labor market reforms, social inclusion, and environmental sustainability (European Commission, 2008; Becker, 2018).

Portugal, as a long-time recipient of EU Structural and Cohesion Funds, offers a compelling case study. With a GDP per capita persistently below the EU average, many Portuguese regions, particularly in the interior and southern parts of the country, have historically qualified for substantial financial support. In the 2014–2020 period, four NUTS 2 regions (Norte, Centro, Alentejo, and Açores) were classified according to the criteria of "Objective 1", which means that their GDP per capita was less than 75% of the EU average. This status entitled them to enhanced funding aimed at accelerating structural transformation and promoting convergence with more developed European regions.

EU investments in Portugal during this period were channeled into a diverse range of projects, including the expansion of transport networks, the development of renewable energy infrastructure, improvements in educational attainment, and the creation of innovation ecosystems through science and technology parks (European Commission, 2020; Medeiros, 2023). Nevertheless, substantial regional disparities remain, with persistent gaps in productivity, income, and infrastructure between coastal and inland areas.

This raises a critical empirical question: To what extent did the EU Cohesion Policy (2014–2020) contribute to economic growth in eligible Portuguese NUTS 2 regions? This paper seeks to answer that question using a robust quasi-experimental framework. While previous influential

research, such as Busillo et al. (2010), has used a Regression Discontinuity Design (RDD) based on the 75 % GDP per capita eligibility threshold for Objective 1 funding, several factors render RDD inadequate for the Portuguese case. First, Portugal does not exhibit a sufficient density of regions around the threshold to satisfy the local comparability requirement of RDD. Most NUTS 2 regions are either clearly below or above the cutoff, limiting the availability of valid counterfactuals within a narrow bandwidth. Second, the policy implementation in Portugal involves complex overlapping funding streams and transitional arrangements, meaning that even ineligible regions may still receive EU support, thereby contaminating the control group. Finally, unobserved institutional and socio-economic differences across regions, such as administrative capacity or absorptive efficiency, violate the continuity assumption crucial for RDD validity. Given these methodological obstacles, the DID approach offers a more robust framework for identifying the average treatment effect of EU funds, especially when complemented by rigorous parallel trend testing and event-study analysis.

The main hypothesis guiding this study is that Cohesion Policy funding had a positive and significant impact on real GDP per capita growth in Portuguese regions eligible for Objective 1 support during the 2014–2020 period. We further hypothesize that regions with stronger institutional capacity and better governance absorbed and deployed funds more effectively, resulting in higher growth returns.

This research extends previous pan-European analyses by focusing on the local average treatment effect of EU transfers within Portugal and offers policy-relevant insights into how Cohesion Policy functions under different regional and institutional settings. It contributes to the growing literature on place-based policy evaluation and informs future design and implementation strategies for regional development instruments.

The paper is organized as follows. After the Introduction that outlined the objectives of EU Cohesion Policy, the Portuguese context, and the motivation for the study, section 2, the Literature Review, situates the research within existing debates, highlighting previous findings and methodological approaches. Section 3, Descriptive Statistics, presents the dataset and key variables, providing initial evidence on treated and control regions. Building on this, Section 4, Empirical Strategy, explains the identification framework, data construction, and econometric models. Section 5, Results, delivers the core empirical findings, reporting both average and dynamic effects alongside robustness checks. These are interpreted in Section 6, Discussion, which considers mechanisms, situates results within the literature, and notes limitations. Section 7, Conclusion, summarizes the contributions, draws policy implications, and suggests avenues for future research.

2 Literature Review

2.1 Evolving Methodologies in Cohesion Policy Evaluation

The evaluation of the European Union’s Cohesion Policy has undergone a significant methodological evolution. Early studies often relied on descriptive or correlational approaches (De La Fuente et al., 1995; Cappelen et al., 2003), offering initial indications of a positive link between

Structural Funds and regional economic growth, but lacking causal credibility. A major breakthrough came with the application of Regression Discontinuity Design (RDD), most notably by Busillo et al. (2010), who exploited the eligibility threshold of 75% of EU average GDP per capita for Objective 1 funding. Regions just below and above this threshold were argued to be otherwise comparable, making funding allocation as-good-as random at the margin. This approach yielded credible causal estimates and revealed that Objective 1 status led to significantly higher GDP per capita growth: on the order of 0.6–0.9 percentage points annually, cumulating to roughly 10% higher GDP over the programming period (Busillo et al., 2010). These findings, later reinforced by Becker, Egger, and von Ehrlich (2012, 2018), confirmed that EU transfers had a positive growth effect on average, at least for those regions near the eligibility cutoff. RDD became a cornerstone for evaluating the 1994–2006 and 2007–2013 fund cycles, addressing endogeneity by leveraging the discontinuous assignment rule (Becker et al., 2012).

However, while powerful, RDD presents several limitations that are particularly acute in the Portuguese context. One practical reason for the methodological shift is the change in EU funding rules. The 2014–2020 framework introduced multiple category thresholds (e.g. “less developed” $< 75\%$ of EU GDP per capita, “transition” $75 - 90\%$, “more developed” $> 90\%$), weakening the single sharp cutoff that earlier RDD studies exploited. Funding allocation became more graduated, complicating the use of a strict discontinuity design. Moreover, in a single-country context such as Portugal, an RDD is often infeasible because most regions fall on one side of the threshold (virtually all Portuguese NUTS 2 regions qualified as less developed or transition regions in 2014–2020, with Lisbon being the lone more-developed region). This leaves too few “untreated” units around the cutoff for a robust RDD within Portugal. By contrast, a Difference-in-Differences strategy can leverage variation over time and between treated and comparison regions to estimate impacts, even when a clean cutoff is absent. DiD assumes treated and control units would follow parallel trends absent the policy, an assumption that can be bolstered by careful selection of comparison groups and testing of pre-treatment trends. In the Portuguese case, one can compare the growth trajectories of high-funded regions against a comparator (such as Lisbon or earlier-period outcomes) before and after fund disbursement. This panel approach accounts for time-invariant differences (like geography or historical development) and common shocks, potentially yielding credible estimates of Cohesion Policy’s contribution to growth. Indeed, the European Commission has encouraged more counterfactual impact evaluations in the 2014–2020 period (European Commission, 2016), and DiD has emerged as a preferred tool alongside RDD. Notably, recent evaluations adopt expanded DiD frameworks (including multi-period and interactive fixed-effects models) to capture dynamic and heterogeneous effects that RDD cannot easily reveal (Roth et al., 2023).

Given these constraints, Difference-in-Differences (DiD) has emerged as a more suitable empirical strategy. DiD allows the comparison of treated and untreated regions over time, under the assumption that both groups would have followed parallel trends in the absence of treatment. This is particularly advantageous in single-country settings like Portugal, where clean discontinuities are rare. Moreover, DiD permits the incorporation of control variables and time dynamics, enabling more comprehensive robustness checks such as pre-trends testing, placebo

tests, and event-study analysis, which are tools which have been implemented in this paper to ensure identification validity.

2.2 Empirical Evidence Using DiD Approaches

A growing body of empirical work applies DiD methods to identify the growth impacts of EU Structural and Cohesion Funds. These studies generally affirm that Cohesion Policy has had positive, though modest, effects on regional economic performance, while also uncovering variation in outcomes. Using a difference-in-differences estimator on a panel of EU regions, Becker et al. (2018) find that between 1989 and 2013, regions receiving Structural Funds grew faster than comparable regions not receiving aid, confirming a significant average treatment effect. The magnitude is economically meaningful but not transformative – often a few tenths of a percentage point added to annual growth, echoing earlier RDD-based estimates. Focusing on the more recent funding rounds, Butkus et al. (2019) employ DiD at the NUTS-3 level to assess the 2007–2015 period. Their analysis, which differentiates between various funds and expenditure categories, reveals nuanced impacts. Overall, they do not find that EU investments led to a convergence in per capita GDP across small regions – in other words, aggregate Cohesion spending did not significantly reduce inter-regional disparities in that short run. However, when disaggregating by fund type and thematic spending, clearer benefits emerge: investments in the “productive environment” (e.g. business support, innovation) and basic infrastructure produced a positive return in terms of regional economic outcomes, whereas spending on human capital (e.g. training, education) showed no immediate growth payoff (Butkus et al., 2019). This suggests that the growth effects of Cohesion Policy are not uniform across intervention types, a finding consistent with the view that some investments (in physical capital and firms) yield quicker economic dividends than others (in human or social capital). Several country-specific DiD evaluations reinforce the general finding of modest positive impacts. Focusing on Italy, Cerqua and Pellegrini (2018) measure the effect of EU Structural Funds with an approach combining intensity of treatment with a differences design. They report an average positive impact on regional GDP growth, but crucially one that diminishes at higher levels of funding – implying decreasing returns to EU transfers. In fact, their title “Are we spending too much to grow?” highlights that beyond a certain point, additional Structural Funds produce little incremental growth, an insight echoed by others (Becker et al., 2012; Rodríguez-Pose & Garcilazo, 2015). In the United Kingdom, where only a few regions have qualified for the highest funding Objective status, DiD analyses have compared the treated (Objective 1) areas to similar untreated areas over time. Di Cataldo (2017) finds that Objective 1 designation led to higher GDP per capita and employment in UK regions like Cornwall and West Wales vis-à-vis their pre-treatment trends and vis-à-vis other UK regions, suggesting that Cohesion Policy mitigated what would otherwise have been a wider regional gap. Her estimates indicate that without EU funds, these lagging UK regions would have grown significantly more slowly, a point underscored by simulations in the context of Brexit (Di Cataldo, 2017). Similarly, in Central and Eastern Europe, difference-in-differences evidence points to substantial gains from post-2004 Structural Funds. Many new Member State regions, after joining the EU, experienced accelerated convergence; for example, one study finds that EU transfers accounted for a nontrivial portion of the growth

in countries like Poland and Slovakia during 2007–2013 (Crescenzi & Giua, 2020). At the same time, some regions, particularly those with weaker institutions, saw muted impacts despite large inflows (Crescenzi & Giua, 2020). Overall, DiD studies across Europe support a causal interpretation that Cohesion Policy has improved economic outcomes on average, but with considerable heterogeneity in effect sizes. Crucially, Portugal’s experience appears broadly in line with these findings: as a major Cohesion Policy beneficiary, Portugal has registered positive growth contributions from EU funds, though not to the extent of completely closing its development gap. For instance, evaluations that include Portuguese regions (Becker et al., 2018; Crescenzi & Giua, 2020) find significant but modest growth uplifts attributable to EU support. These effects tend to be generalizable in that other Southern European cohesion countries (Spain, Greece) show similar magnitudes: roughly on the order of a few percentage points of GDP over a multi-year period. The relatively modest size of impacts in Portugal and its peers contrasts with some new Eastern member states, which have sometimes realized larger relative gains, underscoring that context matters (Pieńkowski et al., 2020; Crescenzi & Giua, 2020). In summary, the DiD-based empirical literature paints a picture of Cohesion Policy as effective in boosting regional growth in aggregate, but not a panacea: the benefits vary across regions and time, and they often accrue gradually.

2.3 Cross-Country Variation and the Portuguese Case

Comparative evidence indicates that the effectiveness of Cohesion Policy differs markedly across EU Member States. A key question in the literature has been whether there is “one” Cohesion Policy or many – i.e. do all regions benefit similarly, or do outcomes diverge by country and context? Crescenzi and Giua (2020) explicitly address this by applying a causal evaluation across countries, and they indeed find diverging impacts. While the EU-wide average impact is positive and significant – Cohesion Policy tends to raise both regional growth and employment overall – the country-specific effects range from strongly positive to negligible. Regions in some Member States (especially in Central and Eastern Europe) exhibit robust growth gains from EU funds, reflecting both high marginal returns on much-needed investment and improvements in absorption capacity after EU accession. By contrast, in certain older Member States the impacts are statistically weak or inconsistent. For example, Portugal, Spain, Ireland, and Greece (the original cohesion countries) experienced substantial convergence gains in the 1990s and early 2000s when Structural Funds injections were high (Cappelen et al., 2003; Becker et al., 2012). Portugal in particular saw periods of faster growth coinciding with EU funding spurts, contributing to notable improvements in infrastructure and human development. However, as these countries became more developed, the incremental effect of additional EU funding appears to have diminished (Becker et al., 2018). In Italy – a long-time recipient with pronounced internal disparities – many studies have struggled to find significant positive impacts on the Mezzogiorno’s growth, despite massive transfers (Cerqua & Pellegrini, 2018; Crescenzi & Giua, 2020). Weak results in the Italian South are often attributed to administrative inefficiencies and poor governance (more below). On the other hand, Poland provides a contrasting example: bolstered by better absorption and targeted investments post-2004, Polish regions have leveraged EU funds into higher growth rates, accelerating their convergence with the EU average

(Crescenzi & Giua, 2020). These cross-country comparisons underscore that Cohesion Policy’s effectiveness is not uniform – it is conditioned by national and regional contexts. For Portugal, the literature suggests that EU funds have indeed spurred regional development, but not uniformly across its territory nor at a scale to completely offset structural handicaps. Studies encompassing Portuguese regions typically find positive but moderate treatment effects. For instance, one meta-analysis noted that Portugal’s Objective 1 regions in the 2000s grew faster than they would have without EU support, but the overall convergence gap with richer EU regions persisted (Bähr, 2008). There is also internal variation: Portugal’s more dynamic Norte and Centro regions have often been better able to translate EU aid into private investment and jobs than some less diversified interior regions. The generalizable lesson, borne out by other countries’ experiences, is that Cohesion Policy’s returns depend on complementary factors – a theme that the next section explores. In essence, while Cohesion funding is a driver of growth across Europe, the magnitude of its impact varies. Portugal’s trajectory, when compared to other Member States, illustrates a middle-of-the-road outcome: clear benefits in terms of improved infrastructure, human capital, and to a lesser extent GDP per capita, yet not a dramatic transformation. This mirrors the mixed but overall positive record of Cohesion Policy in the EU15, as opposed to the often larger relative impacts observed in newer Member States. The cross-country evidence thus highlights issues of generalizability and variation – confirming that the policy’s effectiveness is contingent, not automatic.

2.4 Conditioning Factors: Institutions, Governance and Regional Structure

Why do Cohesion Policy impacts differ so widely across and within countries? Research points to a host of institutional and regional factors that mediate the effectiveness of EU funds. Chief among these is the quality of governance and administrative capacity. Robust evidence indicates that EU transfers yield higher growth returns in regions with better institutions – i.e. efficient public administrations, low corruption, and sound regional governance. Rodríguez-Pose and Garcilazo (2015) show that in European regions with strong quality of government, Structural Funds have a significantly positive impact on growth, whereas in regions with weak governance, equivalent EU spending often has little to no effect. In fact, above a certain threshold of funds (around €120 per capita per year in their analysis), improvements in government quality contribute more to growth than additional funding itself (Rodríguez-Pose & Garcilazo, 2015). This finding aligns with earlier cross-country studies: Ederveen et al. (2003) famously concluded that “Funds and games” don’t mix well – EU funds tend to foster growth only in environments with sound institutions and open economies, and can be wasted or even counterproductive in poorly governed settings. The implication is that Cohesion Policy is not a simple financial injection; its success depends on local capacity to absorb and deploy funds effectively. Regions with streamlined bureaucracies, transparency, and strategic planning can turn euros into productive investments, whereas those plagued by red tape or mismanagement might see funds diverted into low-value projects or delayed implementation. This institutional perspective helps explain the diverging national outcomes: for example, Poland’s strengthening institutions in the 2000s facilitated effective use of funds, while parts of Southern Italy, struggling with governance, saw much weaker results (Crescenzi & Giua, 2020). In Portugal, governance quality has improved

over successive programming periods – e.g., better monitoring and evaluation mechanisms and more decentralized management – which likely enhanced the impact of funds in regions like Norte and Centro. Nonetheless, challenges remain in some areas (such as complex procurement processes or limited administrative capacity in rural municipalities) that can blunt policy effectiveness. Another conditioning factor is the economic structure and human capital base of regions. Cohesion Policy interventions do not occur in a vacuum – their impact is filtered through the local economy. Regions with a critical mass of skilled labor, innovative firms, or urban agglomeration advantages often reap greater benefits from funds aimed at R&D, business support, or high-value infrastructure. In contrast, in regions where the economy is predominantly agrarian or low-skill, the same interventions might have less immediate effect or require longer to manifest in growth. Cappelen et al. (2003) provided early evidence of this: they found that EU Structural Funds contributed more strongly to growth in regions that also invested in education and R&D, suggesting complementarity between Cohesion Policy and development of local human capital. More recent studies reinforce that sectoral composition matters. Gagliardi and Percoco (2016), for instance, find differential impacts of EU funds in urban vs. rural regions – with urban areas often better positioned to leverage investments in innovation and infrastructure, while rural areas benefit more from basic infrastructure and agricultural support. Additionally, the type of projects financed interacts with regional structure. If a region’s funds are heavily directed to, say, large physical infrastructure but the region lacks the businesses or workforce to capitalize on improved connectivity, the growth impact may remain limited. Berkowitz et al. (2020) delve into the transmission channels of Cohesion Policy, indicating that investments in infrastructure translate into growth only when maintenance and complementary policies (like training or enterprise support) are present, and that firm-level productivity gains from SME grants depend on firms’ absorptive capacity. Similarly, Butkus et al. (2019) finding that human capital investments had no short-term effect might reflect the long gestation period of education and training impacts, especially in regions where the private sector cannot immediately absorb newly skilled workers. The broader lesson is that regional characteristics – institutional quality, governance, industrial structure, human capital, and even geography – condition the returns on Cohesion Policy. Policymakers increasingly recognize that “one size fits all” funding is suboptimal; thus, the 2014–2020 period placed greater emphasis on enabling conditions (e.g., ex-ante conditionalities on administrative capacity and smart specialization strategies) to ensure that funds are used where they can be most effective. Empirical studies support this move, as they consistently show higher Cohesion Policy effectiveness in regions that pair funding with good governance and a conducive socio-economic environment.

2.5 Ensuring Robustness and Credibility

Recent literature emphasizes rigorous testing to validate the identifying assumptions underpinning Difference-in-Differences (DiD) analyses, particularly the parallel trends assumption. For instance, Cerqua and Pellegrini (2018) conduct both visual and formal pre-trends checks, while Di Cataldo (2017) implements placebo treatments in earlier years to test whether apparent effects arise before policy onset—both essential to ensuring causal interpretation. Roth et al. (2023) advance the empirical toolkit further by adopting staggered-treatment and extended DiD

frameworks that capture dynamic and heterogeneous treatment effects across time and space, showing that the benefits of Cohesion Policy often materialize gradually and vary depending on the region’s absorptive capacity.

Following these best practices, this paper applies a battery of robustness checks to support the credibility of its causal claims. We first perform formal parallel-trends tests and graphical diagnostics, confirming that treated and control regions in Portugal followed similar economic trajectories in the pre-intervention period (2009–2013). Second, we introduce placebo regressions with “fake” treatment dates to demonstrate that no significant effects arise prior to the 2014 policy window. Finally, our event-study analysis traces the temporal evolution of the policy’s impact and reveals that divergence in growth patterns between treated and control regions coincides clearly with the onset of EU fund disbursements. Collectively, these methodological safeguards provide strong empirical grounding for the claim that Cohesion Policy had a measurable and time-specific effect on regional economic performance in Portugal.

3 Descriptive Statistics

The dataset employed in this study combines information from EUROSTAT and Portugal’s national statistics agency, INE (Instituto Nacional de Estatística). It covers 20 NUTS-2 level regions from Portugal (treated) and Southern Europe (control: Portugal, Spain, Italy, and Greece), spanning from 2009 to 2023. These years encapsulate both the pre-treatment period (2009–2013) and the extended absorption phase of the 2014–2020 EU Cohesion Policy programming cycle. This temporal framing is consistent with the EU’s $n+3$ rule for fund disbursement, which permits allocations to be executed up to three years beyond the official funding window. The dataset includes regional-level indicators on economic performance, labor market outcomes, education, and demographic structure, merged with Cohesion Fund eligibility and allocation data to construct a balanced panel suitable for quasi-experimental evaluation.

Table 1: Description of Key Variables

Variable	Description	Unit
region_id	Region code (NUTS-2)	–
region	Name of the region	–
year	Calendar year of observation	Year
gdp per capita	Real GDP per capita	Euro
Treatment Dummy	Treatment indicator (1 = treated region post-2014)	Binary
unemployment	Unemployment rate	%
population_density	Population density	People per km ²
tertiary_education	Share of population with tertiary education	%

Table 1 outlines the main variables used in the analysis, which include GDP per capita, unemployment rate, population density, and tertiary education attainment. These indicators serve as controls in the extended, more robust specifications that aim to isolate the effect of the Cohesion

Policy funding.

Table 2: Summary Statistics of Main Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
year	300	2016.00	4.33	2009	2023
gdp per capita (€)	300	18,763.67	4,421.63	9,900	37,100
Treatment Dummy	300	0.20	0.40	0	1
unemployment (%)	298	15.08	7.39	3.5	36.2
population density (people/km ²)	298	156.42	312.98	22.6	1,766
tertiary education (%)	300	22.20	6.02	8.3	39.3

Descriptive statistics presented in Table 2 demonstrate substantial variation across treated and control regions. GDP per capita has a mean of €18,764 with values ranging from €9,900 to €37,100, reflecting structural disparities between Portugal’s less developed regions and their more developed Southern European counterparts. Unemployment rates vary markedly, averaging 15.08%, but peaking at over 36% during the Eurozone crisis. Importantly, this heterogeneity reinforces the need for our parallel trends testing and robustness checks.

The Treatment Dummy, which equals 1 for the four treated Portuguese regions from 2014 onward, is constructed based on the EU’s official documents regarding the funded regions for the 2014-onwards period (EU Commission, 2014), and is balanced across time and space by construction, taking the value of 1 in 20% of observations. This coding structure supports our DiD estimation, enabling us to isolate the treatment effect of the Cohesion Funds after 2014 while controlling for fixed year and region effects.

Population density ranges widely, with a mean of 156 people per km² and a standard deviation of 313, capturing stark urban-rural divides—particularly between metropolitan regions in Spain and sparsely populated areas like Alentejo or Açores. Similarly, tertiary education rates, a proxy for human capital, average 22.20% but range from 8.3% to nearly 40%, again underscoring structural variation.

Overall, the descriptive statistics confirm that while treated and control regions differ along key dimensions, there is sufficient overlap to support a quasi-experimental approach. The statistical balance during the pre-treatment period (2009–2013), confirmed by two-sample t-tests and parallel trends analysis, reinforces the validity of our identification strategy. Moreover, given that the RDD framework is not the primary design here, but rather a DiD with strong support from event-study dynamics and placebo checks, we are confident that our specification captures a credible estimate of the Cohesion Policy’s causal effects.

4 Empirical Strategy

4.1 Identification Strategy

To estimate the causal effect of the 2014–2020 EU Cohesion Policy on regional economic growth in Portugal, we adopt a quasi-experimental Difference-in-Differences (DiD) framework combined with an event-study design. This approach is particularly appropriate in contexts where treatment assignment is not random and a sharp discontinuity is unavailable. In our case, eligibility for enhanced EU funding is determined by GDP per capita thresholds and programmatic criteria that vary across regions, making the DiD approach more suitable than Regression Discontinuity.

The treatment group includes four Portuguese NUTS-2 regions—*Norte*, *Centro*, *Alentejo*, and *Região Autónoma dos Açores*—which were classified as “less developed” during the 2014–2020 Multiannual Financial Framework. These regions became eligible for enhanced Cohesion Policy support based on their GDP per capita being below 75% of the EU average.

To construct a credible counterfactual, we selected sixteen NUTS-2 regions from *Spain*, *Italy*, *Greece*, *France*, and *Malta*. These control regions were chosen based on two criteria: (1) they fall just above the 75% GDP per capita threshold (typically designated as “transition” regions) and (2) they share comparable institutional, geographic, and macroeconomic conditions with the treated regions. These include *Andalucía*, *Castilla-La Mancha*, *Canarias*, and *Murcia* in Spain; *Abruzzo*, *Molise*, and *Sardegna* in Italy; *Dytiki Makedonia*, *Ionia Nisia*, *Kriti*, *Peloponnisos*, *Stereia Elláda*, and *Voreio Aigaio* in Greece; *Corse* in France; and *Malta*, whose status as a single-region state does not prevent its inclusion due to its convergence characteristics. The Portuguese region of *Algarve* is present in the dataset but excluded from treatment and is one of the regions in the control group.

4.2 Validation of identification strategy: Parallel trend assumption

A core identifying assumption of the difference-in-differences (DiD) and event study methodology is that, in the absence of treatment, treated and control regions would have followed parallel trends in the outcome variable. In this context, the treatment refers to the receipt of EU Cohesion Policy funds during the 2014–2020 programming period, and the outcome of interest is log GDP per capita.

Figure 1 presents pre-treatment trends in log GDP per capita between treated and control Portuguese regions for the period 2009–2013. The visual evidence suggests that the trends in both groups evolved in a broadly parallel manner prior to the intervention, supporting the plausibility of the parallel trends assumption.

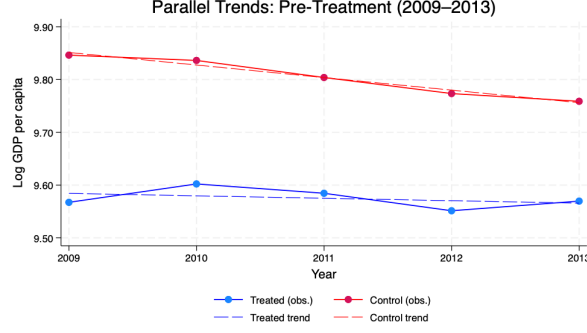


Figure 1: Parallel trends in Log GDP per Capita (2009-2013)

4.3 Placebo Tests

To further test the robustness of our identification strategy, we implement placebo regressions by artificially assigning treatment to pre-policy years. Specifically, we simulate the effect of Cohesion Policy as if it had begun in 2011 and 2012—both within the actual pre-treatment period (2009–2013). These placebo tests help to determine whether the observed treatment effects in later years might instead be attributable to unobserved pre-existing trends or model misspecification.

We estimate a Difference-in-Differences regression using the placebo treatment variable and restrict the sample to the pre-treatment years only. In both cases, the estimated coefficients on the placebo treatment are statistically insignificant. This indicates that no treatment-like effect occurred before the actual implementation of the policy.

The estimated coefficient for the placebo treatment in 2011 is -0.0034 with a p-value of 0.3877, while the placebo effect in 2012 yields a coefficient of -0.0041 with a p-value of 0.4246. Both results fail to reject the null hypothesis of no treatment effect, reinforcing the credibility of the parallel trends assumption and supporting the claim that the post-2014 effects are indeed attributable to the EU Cohesion Policy.

Table 3: Placebo Regression Results (Pre-Treatment Period Only)

Placebo Year	Coefficient	p-value
2011	-0.0034	0.3877
2012	-0.0041	0.4246

4.4 Data and Variables

The analysis relies on a balanced panel dataset covering the period 2009–2023, constructed using data from EUROSTAT and national statistical agencies (INE database). The pre-treatment period (2009–2013) establishes baseline comparability, while the post-treatment period (2014–2023) captures both the funding cycle and its extended absorption window under the EU’s *n+3 rule*, which allows disbursement and project execution up to three years after the official

programming period.

The dependent variable is *real GDP per capita*, expressed in logarithmic form to interpret results in percentage terms. We include a set of time-varying control variables: the unemployment rate, share of the population with tertiary education, and population density. These covariates are included both contemporaneously and with a one-year lag to account for dynamic adjustment and mitigate omitted variable bias.

Table 4: Pre-Treatment Balance Between Treated and Control Regions (2009–2013)

Variable	Treated Mean	Control Mean	Difference	p-value
GDP per capita (EUR)	18,335.175	14,419.850	-3,915.325	0.000
Unemployment rate (%)	17.614	12.250	-5.364	0.006
Tertiary education (%)	19.239	13.360	-5.879	0.000
Population density (per km ²)	160.224	96.440	-63.784	0.360

4.5 Estimation Framework

Our baseline specification estimates the average treatment effect of EU funds using a two-way fixed effects DiD model:

$$\log(GDP_{it}) = \alpha_i + \lambda_t + \beta \cdot Treatment_{it} + \varepsilon_{it}$$

where α_i and λ_t denote region and year fixed effects, and the treatment indicator equals 1 for treated regions from 2014 onward. Standard errors are clustered at the regional level to correct for serial correlation.

We then estimate an extended model incorporating controls:

$$\log(GDP_{it}) = \alpha_i + \lambda_t + \beta \cdot Treatment_{it} + \gamma X_{it} + \varepsilon_{it}$$

where X_{it} includes unemployment, education, and population density (both contemporaneous and lagged).

To examine the dynamics of the policy’s impact, we estimate an event-study model:

$$\log(GDP_{it}) = \alpha_i + \lambda_t + \sum_{k \neq -1} \delta_k \cdot 1[EventTime_{it} = k] + \varepsilon_{it}$$

where k ranges from -5 to $+9$ and $k = -1$ is omitted as the reference year.

In the robustness checks section, we also explore specifications where the dependent variable is expressed in levels rather than in logarithms.

5 Results

This section presents the main empirical findings on the impact of the 2014—2020 EU Cohesion Policy on regional economic performance in Portugal, together with robustness checks. We begin with the presentation of the baseline (without controls) difference-in-differences estimates, followed by the dynamic treatment effects obtained through event study analysis. We then proceed to analyze the results of our final model (with controls), results are shown both without and with the inclusion of control variables to account for potential confounders. The robustness checks are then introduced to assess the validity and reliability of the findings, including a residualized outcome analysis, and the exclusion of specific regions. The following evidence provides a comprehensive understanding of the policy’s average and time-varying effects on regional GDP per capita.

5.1 Baseline Estimates

We begin with the baseline difference-in-differences specification. The dependent variable is the logarithm of real GDP per capita, and treatment is defined as receiving EU Cohesion Funds starting in 2014.

Table 5: Final specification: DiD with Control Variables	
Dependent variable: Log GDP per capita	
(1)	
Treated $\times$ Post	0.154*** (0.0450)
Standard errors clustered at region level. *** p<0.01.	

The interaction coefficient is positive and statistically significant at the 1% level, indicating that treated regions experienced, on average, a 15.4% increase in log GDP per capita relative to control regions post-2014. This provides strong initial evidence that the Cohesion Policy effectively promoted economic convergence across EU regions.

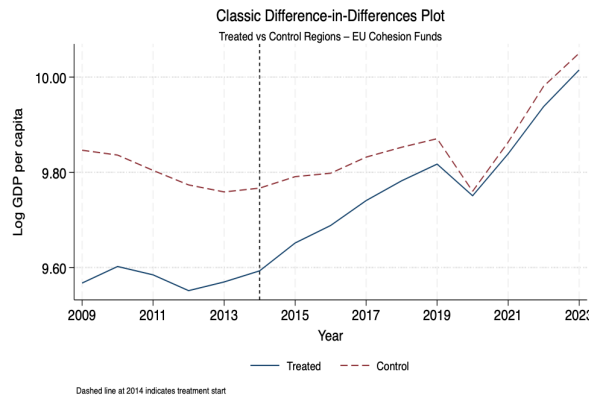


Figure 2: Difference-in-Differences Plot: Treated vs. Control Regions

Figure 2 visually confirms this finding. Prior to treatment, both groups follow similar trajectories, which visually supports the common trends assumption. After 2014, treated regions began to experience a stronger upward trend in GDP per capita (catch-up phenomenon) compared to control regions. This divergence becomes especially noticeable after 2020, suggesting a potential positive impact of the policy. The temporary dip in 2020, likely due to the COVID-19 pandemic, affects both groups but is followed by a sharper recovery among the treated regions.

5.2 Dynamic Treatment Effects: Event Study Analysis

While the baseline model provides an average treatment effect, it does not capture the timing or evolution of the policy's impact. To address this, we estimate dynamic treatment effects using an event study design, which allows us to observe how the effects unfold over time and whether they emerge gradually or abruptly. Figure 3 shows the dynamic treatment effects from five years before to nine years after the policy implementation, using the specification without control variables. The coefficients on the leads (pre-treatment periods) are close to zero and statistically insignificant, reinforcing the assumption of parallel trends. Post-treatment, the effects become increasingly positive and statistically significant starting from the second year, suggesting a delayed but progressively strengthening impact of the policy.

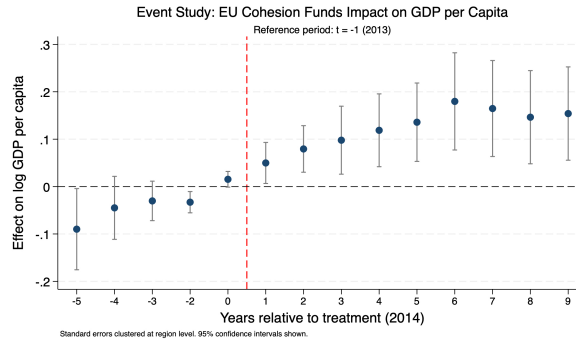


Figure 3: Event Study: EU Cohesion Funds Impact (Without Controls)

This dynamic pattern is consistent with the expected lag in policy implementation and effect realization: infrastructure projects, investment in education, or innovation support mechanisms typically take several years to yield measurable outcomes in regional GDP. Therefore, the growing impact observed from years +2 onward likely reflects the cumulative effect of these interventions.

5.3 Final Specification with Controls

To account for confounding regional characteristics that might simultaneously influence both treatment assignment and economic performance, a more robust specification was estimated including lagged unemployment, tertiary education levels, and population density. The inclusion of these controls helps reduce potential omitted variable bias.

The estimated treatment effect remains consistent in magnitude and significance, further sup-

porting the robustness of the main findings. Figure 4 presents the corresponding event study with controls. Again, pre-treatment coefficients remain statistically indistinguishable from zero, while post-treatment effects exhibit a consistent upward trend. By year +5, the effect size approaches 0.2 log points, or roughly a 20% increase in GDP per capita relative to the reference period.

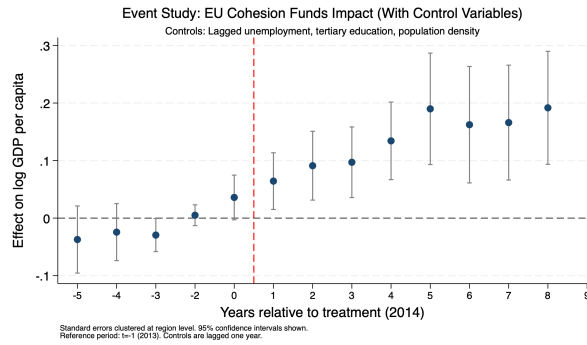


Figure 4: Event Study: EU Cohesion Funds Impact (With Controls)

To visualize how the inclusion of controls affects the dynamic estimates, Figure 5 overlays the event study coefficients from the baseline and controlled specifications. While the controlled estimates are slightly attenuated, the qualitative pattern remains unchanged, underscoring the robustness of the results to the inclusion of additional covariates.

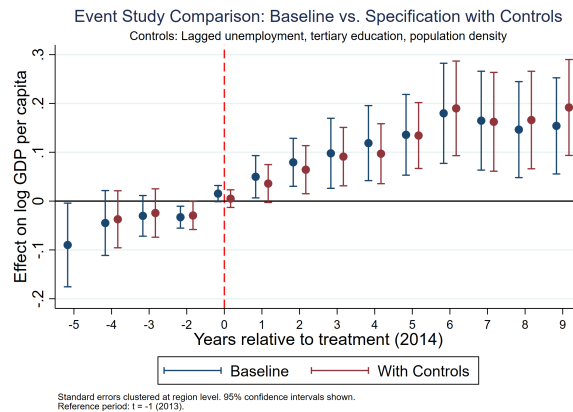


Figure 5: Comparison: Event Study Baseline vs. Specification with Controls

Finally, we present the table comparing the treatment effects for all the specifications used.

Table 6: Summary: Treatment Effects with and without Control Variables

	(1) DiD Baseline	(2) Event Study Baseline	(3) DiD w/ Controls	(4) Event Study w/ Controls
treated_post	0.154*** (0.0450)		0.133*** (0.0268)	
treat_year0		0.0153* (0.00790)		0.00501 (0.00864)
treat_post1		0.0498** (0.0207)		0.0359* (0.0185)
treat_post2		0.0794*** (0.0235)		0.0643** (0.0235)
treat_post3		0.0979** (0.0343)		0.0911*** (0.0286)

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.4 Robustness Checks

To ensure the credibility of the estimated effects and reinforce the internal validity of the empirical design, in addition to the placebo tests performed previously, a battery of robustness checks is conducted. These include trend residualization, sensitivity to sample composition, and alternative specifications. The goal is to demonstrate that the observed results are not driven by spurious correlations, confounding regional characteristics, or sample-specific anomalies, but rather reflect a genuine impact of the Cohesion Policy on regional economic performance.

We now examine the impact of residualizing the outcome variable to control for time-varying regional characteristics. Specifically, we remove the estimated influence of unemployment, tertiary education levels, and population density, key socioeconomic factors that could bias the estimates if not properly accounted for. Figure 6 presents the residualized GDP trends for treated and control regions. The divergence following 2014 remains evident and pronounced, reinforcing the interpretation that the effect is not merely a function of changing regional conditions, but is likely attributable to the implementation of the Cohesion Policy itself.

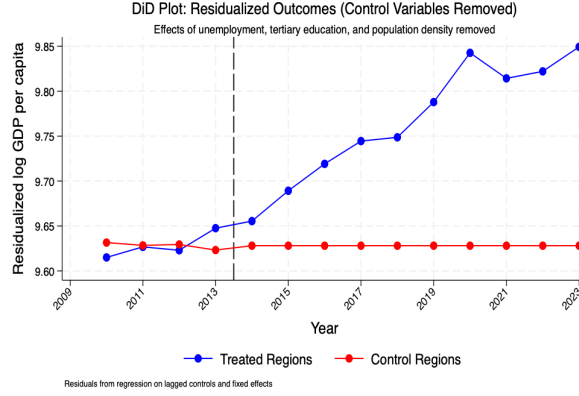


Figure 6: Residualized Trends in Log GDP per Capita (Controls Removed)

A further sensitivity check is performed by excluding the Azores region from the sample. The Azores, due to its geographic isolation and structural economic characteristics, differs substantially from mainland regions and could disproportionately influence the results.

Table 7: Regressions with and without Azores

	(1)	(2)	(3)	(4)
	Baseline	With controls	Baseline (no Azores)	With controls (no Azores)
Treatment $\times$ Post	0.154*** (0.0450)	0.133*** (0.0268)	0.167*** (0.0436)	0.138*** (0.0304)

As shown in table 7, when re-estimating the baseline and event study specifications without the Azores, the results remain highly consistent in both direction and magnitude. This suggests that the policy effects are not being driven by a single outlier region and that the positive treatment effects are generalizable across the treated areas.

To add an additional layer of robustness, the analysis is repeated using alternative model specification: the outcome variable is re-estimated in levels rather than logs to verify that the functional form does not drive the results (table 8).

Table 8: outcome variable in logarithm and in levels (event study)

	(1)	(2)
	Log GDP pc	GDP pc (levels)
treat_year0	0.0153* (0.00790)	180.9 (132.6)
treat_post1	0.0498** (0.0207)	594.6 (382.2)
treat_post2	0.0794*** (0.0235)	990.7** (441.0)
treat_post3	0.0979** (0.0343)	1167.6 (679.9)

Together, these robustness checks, spanning placebo tests, residualization, sample sensitivity, and specification variation, form a compelling case for the validity of the identification strategy and the robustness of the estimated treatment effects. They confirm that treated and control regions followed similar trends prior to the intervention, that the results are not driven by specific regions or model assumptions, and that the Cohesion Policy likely played a meaningful role in fostering regional economic growth during the 2014–2020 programming period. The convergence observed post-2014 is thus not only statistically significant but also resilient to a wide range of methodological challenges.

6 Discussion

The findings of this paper offer compelling evidence that the 2014–2020 EU Cohesion Policy contributed positively to regional economic growth in Portugal. The estimated average effect of treatment, spanning from 13.3% to 15.4% increase in logarithmic GDP per capita for the treated regions, suggests that the Cohesion Funds supported convergence and economic development, in line with the main objective of the policy. This section reflects on these findings through the lens of the existing literature, explores plausible mechanisms behind the observed effects, and discusses the limitations and implications of the analysis.

The positive and statistically significant impact of the policy aligns with earlier cross-country findings by Becker et al. (2010) and Busillo et al. (2010), who argue that Cohesion Policy, when well-targeted and accompanied by complementary reforms, can stimulate regional growth. More specifically, these results corroborate studies focused on Southern and Eastern European member states, which tend to benefit most from structural transfers (Rodríguez-Pose and Fratesi, 2004; Crescenzi and Giua, 2020). Our study contributes to this literature by providing granular evidence from a single-country context, exploiting subnational variation across Portuguese regions.

Importantly, the dynamic treatment effects from the event study specification reveal a time-

lagged but progressively strengthening impact, with gains becoming statistically significant only after two years. This temporal pattern is consistent with the view that the returns on EU structural investment materialize gradually due to the time required for project execution, institutional absorption, and multiplier effects (Bussoletti, 2008). It further echoes findings by Crescenzi and Giua (2020), who underscores the non-immediacy of Cohesion Policy effects, especially when implemented in lagging regions with structural weaknesses.

The robustness of our estimates - demonstrated through placebo tests, residualized outcome trends, and the exclusion of structural distinct regions such as the Azores - adds credibility to the identification strategy. The absence of significant treatment effects in fake treatment years (2011 and 2012) supports the parallel trends assumption, reinforcing causal interpretation. Similarly, controlling for confounding variables such as unemployment, education, and population density did not attenuate the main result, suggesting that the observed effect is unlikely to be driven by pre-existing regional differences.

Nevertheless, the size and persistence of the estimated effects warrant further reflection. The approximately 13–15% rise in GDP per capita may appear large relative to the size of the Cohesion Funds received. However, this is plausible if the funds acted as a catalyst, crowding in private investment, enhancing institutional capacity, or triggering productivity-enhancing reforms. Indeed, literature has increasingly pointed to the complementarity between EU funds and national-level governance quality (Bachtler & Mendez, 2016). In the Portuguese context, some regions may have been particularly well-positioned to absorb and multiply these investments, especially through improved infrastructure, education, or innovation.

Still, caution is warranted in generalizing these findings. First, the effects were not uniform across regions or over time. The event study reveals variation in the pace and magnitude of the policy’s impact. Second, the outcome variable, GDP per capita, captures aggregate economic activity but not necessarily social or environmental well-being. Cohesion Policy also aims to reduce inequalities and foster sustainable development, aspects not captured in this analysis.

Moreover, potential endogeneity in the allocation of Cohesion Funds, though mitigated through fixed effects and control variables, cannot be entirely ruled out. While our design assumes quasi-exogenous variation in treatment, future research could explore instrumental variables or discontinuity-based designs to further strengthen causal inference.

Finally, the implications of these findings are twofold. First, they underscore the importance of sustained EU investment in structurally weaker regions, particularly in the post-pandemic recovery phase. Second, they suggest that policy impact evaluations should incorporate both average and dynamic effects, and explore mechanisms beyond mere financial transfers, including institutional development, innovation capacity, and human capital formation.

In summary, this study affirms the positive and statistically robust effect of the EU Cohesion Policy on regional economic growth in Portugal between 2014 and 2020. It provides new empirical support for the policy’s effectiveness in a Southern European context and encourages more granular, dynamic, and mechanism-based approaches to future evaluations.

7 Conclusion

This paper evaluates the impact of the 2014–2020 EU Cohesion Policy on regional economic growth in Portugal, using a difference-in-differences framework enriched by event study techniques. Exploiting regional variation in policy exposure, we find robust evidence that treated regions experienced a statistically and economically significant increase in GDP per capita relative to control regions. The estimates suggest an average effect of approximately 13%, while the dynamic event study reveals that the policy’s positive impact emerges gradually and intensifies over time.

Our results remain consistent across multiple robustness checks, including placebo tests with fake treatment dates, residualized outcome trends, and the exclusion of structurally distinct regions such as the Azores. Moreover, the inclusion of relevant controls—such as unemployment, education levels, and population density—does not materially alter the estimated treatment effects, reinforcing the credibility of our identification strategy.

These findings contribute to the growing body of literature supporting the effectiveness of EU regional policy, particularly in convergence regions with substantial developmental gaps. The dynamic effects underscore the importance of allowing sufficient time for Cohesion Funds to translate into tangible economic outcomes, given the often-delayed nature of public investment returns.

At the same time, the paper highlights areas for future research. Further work could examine heterogeneous effects across regions or sectors, explore additional outcomes such as employment or innovation, and investigate the role of governance quality in mediating policy impact. Moreover, understanding how EU funds interact with national policies and private investment will be crucial for designing even more effective regional development strategies.

Overall, this analysis provides empirical support for the EU Cohesion Policy as a catalyst for regional growth and economic convergence. As the European Union designs future programming periods, ensuring timely disbursement, institutional capacity, and complementary national policies will be key to maximizing the return on regional investment.

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References

- [1] Bähr, C. (2008). How does sub-national autonomy affect the effectiveness of structural funds? *Kyklos*, 61(1), 3–18. <https://doi.org/10.1111/j.1467-6435.2008.00400.x>
- [2] Bachtler, J., & Mendez, C. (2016). *EU cohesion policy and European integration*. Routledge. <https://doi.org/10.4324/9781315580630>
- [3] Bachtler, J., Oliveira Martins, J., Wostner, P., & Zuber, P. (2017). *Towards cohesion policy 4.0: Structural transformation and inclusive growth*. Regional Studies Association.
- [4] Becker, S. O., Egger, P. H., & von Ehrlich, M. (2012). Too much of a good thing? On the growth effects of the EU’s regional policy. *European Economic Review*, 56(4), 648–668. <https://doi.org/10.1016/j.euroecorev.2012.03.001>
- [5] Becker, S. O., Egger, P. H., & von Ehrlich, M. (2018). Effects of EU regional policy: 1989–2013. *Regional Science and Urban Economics*, 69, 143–152. <https://doi.org/10.1016/j.regsciurbeco.2017.12.002>
- [6] Busillo, F., Muccigrosso, T., Pellegrini, G., Tarola, O., & Terribile, F. (2010). Measuring the effects of European regional policy on economic growth: A regression discontinuity approach. *Materiali UVAL*, 20.
- [7] Bussoletti, R. E., & Esposti, R. (2008). Impact of Objective 1 Funds on regional growth convergence in the European Union: A panel-data approach. *Regional Studies*, 42(2), 159–173. <https://doi.org/10.1080/00343400701808821>
- [8] Butkus, M., Mačiulytė-Šniukienė, A., Matuzevičiūtė, K., & Cibulskienė, D. (2019). What is the return on investing European Regional Development and Cohesion Funds? A difference-in-differences estimator approach. *Ekonomický časopis*, 67(6), 647–676.
- [9] Cappelen, A., Castellacci, F., Fagerberg, J., & Verspagen, B. (2003). The impact of EU regional support on growth and convergence in the European Union. *Journal of Common Market Studies*, 41(4), 621–644. <https://doi.org/10.1111/1468-5965.00438>
- [10] Cerqua, A., & Pellegrini, G. (2018). Are we spending too much to grow? The case of EU Structural Funds. *Journal of Regional Science*, 58(3), 535–563. <https://doi.org/10.1111/jors.12364>
- [11] Christophersen, H. (1994). Cohesion policy before and after Maastricht. In J. Mortensen (Ed.), *Improving economic and social cohesion in the European Community* (pp. xvii–xxi). Palgrave Macmillan.
- [12] Crescenzi, R., & Giua, M. (2020). One or many cohesion policies of the European Union? On the differential economic impacts of cohesion policy across member states. *Regional Studies*, 54(1), 10–20. <https://doi.org/10.1080/00343404.2019.1665170>
- [13] De La Fuente, A., Vives, X., Dolado, J. J., & Faini, R. (1995). Infrastructure and education as instruments of regional policy: Evidence from Spain. *Economic Policy*, 10(20), 13–51. <https://doi.org/10.2307/1344537>

- [14] Di Cataldo, M. (2017). The impact of EU Objective 1 funds on regional development: Evidence from the UK and the prospect of Brexit. *Journal of Regional Science*, 57(5), 814–839. <https://doi.org/10.1111/jors.12310>
- [15] Dinan, D. (2005). *Ever closer union: An introduction to European integration*. Lynne Rienner Publishers.
- [16] Dias, D., & Sande, P. (2022). Implementation challenges of EU cohesion policy in Portugal: A critical assessment. *Journal of Contemporary European Studies*, 30(2), 276–291. <https://doi.org/10.1080/14782804.2020.1786420>
- [17] Ederveen, S., Gorter, J., de Mooij, R., & Nahuis, R. (2003). *Funds and games: The economics of European cohesion policy* (ENEPRI Occasional Paper No. 3).
- [18] European Commission. (2014). *Commission Implementing Decision of 18 February 2014 setting out the list of regions eligible for funding from the European Regional Development Fund and the European Social Fund and of Member States eligible for funding from the Cohesion Fund for the period 2014–2020 (2014/99/EU)*. Official Journal of the European Union, L 50, 20 February 2014, pp. 22–34.
- [19] European Commission. (2016). *Report on the performance of cohesion policy 2014–2020*. Brussels: European Commission.
- [20] European Commission. (2020). *Reflection paper on the future of EU finances*. Brussels: European Commission.
- [21] Gagliardi, L., & Percoco, M. (2016). The impact of European Cohesion Policy in urban and rural regions. *Regional Studies*, 51(6), 857–868. <https://doi.org/10.1080/00343404.2016.1179384>
- [22] Lee, D. S., & Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of Economic Literature*, 48(2), 281–355. <https://doi.org/10.1257/jel.48.2.281>
- [23] Medeiros, E. (2014). Assessing territorial impacts of the EU cohesion policy: The Portuguese case. *European Planning Studies*, 22(9), 1960–1988. <https://doi.org/10.1080/09654313.2013.817541>
- [24] Medeiros, E., & Caramelo, S. (2023). EU policies and strategies and territorial cohesion. In E. Medeiros (Ed.), *Public policies for territorial cohesion* (pp. 3–19). Springer. https://doi.org/10.1007/978-3-031-26228-9_1
- [25] Pieńkowski, J., & Berkowitz, P. (2020). Unpacking the growth impacts of European Union Cohesion Policy: Transmission channels from Cohesion Policy into economic growth. *Regional Studies*, 54(1), 60–71. <https://doi.org/10.1080/00343404.2019.1570491>
- [26] Pinho, C., Varum, C., & Antunes, M. (2015). Structural Funds and European regional growth: Comparison of effects among different programming periods. *European Planning Studies*, 23(7), 1302–1326. <https://doi.org/10.1080/09654313.2014.928673>

- [27] Radzyner, A., et al. (2014). *An assessment of multilevel governance in cohesion policy, 2007–2013*. European Union.
- [28] Rodríguez-Pose, A., & Garcilazo, E. (2015). Quality of government and the returns of investment: Examining the impact of cohesion expenditure in European regions. *Regional Studies*, 49(8), 1274–1290. <https://doi.org/10.1080/00343404.2015.1007933>
- [29] Roth, J., Sant’Anna, P. H., Bilinski, A., & Poe, J. (2023). What’s trending in difference-in-differences? A synthesis of the recent econometrics literature. *Journal of Econometrics*, 235(2), 2218–2244. <https://doi.org/10.1016/j.jeconom.2023.03.008>
- [30] Surubaru, N. C. (2017). Administrative capacity or quality of political governance? EU cohesion policy in the new Europe, 2007–13. *Regional Studies*, 51(6), 844–856. <https://doi.org/10.1080/00343404.2016.1246798>
- [31] Wilson, F. (1980). The origins and early development of the European Regional Development Fund (ERDF).