



Financial dynamics in Interreg A: A quantitative analysis of the determinants of budget execution

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Abstract This article offers a comprehensive quantitative analysis of the financial dynamics underlying the EU's Interreg A (cross-border) programmes during the 2014–2020 period. Drawing on microdata from 54 programmes and over 4000 projects, the study explores how participation dynamics and budget execution are shaped by participant profiles and programme management. The principal findings indicate that public organisations predominate both participation and budget allocation, with smaller territories being overrepresented and more affluent areas receiving relatively lower budgets, which is in keeping with cohesion policy goals. The effectiveness of budget execution is positively linked to technical assistance, overall programme size, and institutional quality. Moreover, higher execution rates are associated with programmes that involve lower-population or demographically diverse partnerships, alongside stronger institutional quality and increased investment in technical assistance. These findings complement earlier research focusing on geographic and substantive dimensions, and they provide further conclusions to be considered jointly from academic and policy perspectives.

Keywords European Territorial Cooperation · Interreg · Public programmes budget · Public funds execution · EU regional funds

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1 Introduction

Since the establishment of the European Economic Community, which would later evolve into the European Union (EU) in 1992, Cohesion Policy has constituted a fundamental pillar. This policy is defined as the principal investment strategy dedicated to enhancing economic, social, and territorial cohesion across all EU regions, and it accounts for a highly significant share of the Union's budget. In the current programming period (2021–2027), the policy represents €392 billion, corresponding to 30% of the Union's budget, a proportion that has remained broadly stable since 2000¹.

The EU's Cohesion Policy reflects not only aspects related to economic development and convergence, but also regulatory cohesion, that is, the alignment of public policies across different countries and regions of the Union, as well as territorial cooperation in addressing common challenges. Its overarching aim is to foster the integration of the Single Market alongside broader social, political, and economic dimensions (European Commission 2022). In this context, cross-border cooperation between organisations from different states and regions has been actively promoted (Klatt and Herrmann 2011). Through specific EU initiatives, financed by instruments of its executive arm, the European Commission (EC), measures have been implemented to support such cooperation. One example is the establishment, in 2007, of the European Grouping of Territorial Cooperation (EGTC), which are entities with legal personality under European law. EGTCs enable public authorities from different Member States to form a single joint structure for implementing projects, investments, or policies within the areas they cover. These groupings facilitate cross-border, transnational, and interregional cooperation aiming to strengthen economic, social, and territorial cohesion (Spinaci and Vara-Arribas 2009; Evrard 2016; Caesar 2017).

Nevertheless, the main instrument for promoting cooperation between organisations from different European territories is the so-called European Territorial Cooperation (ETC) (Reitel et al. 2018). This instrument, known as Interreg, currently includes four strands according to their territorial dimension: cross-border cooperation (bordering regions), transnational cooperation (EU macro-regions), interregional cooperation (all EU regions), covering the entire EU and, in some cases, third countries, and outermost regions (European Commission 2023).

Linked to the evolution of the European Union itself and its objectives, the logic of the ETC has evolved. The European Commission began granting funding to cross-border cooperation projects in 1989 to address development problems in border areas (Medeiros 2018). As noted by Perkmann (2003), European trans-state cooperation increased substantially and continuously as a result. Interreg programmes were introduced for the first time in the 1990–1993 period, initially focusing exclusively on cross-border cooperation. The main Interreg goals in this period were to prepare EU border areas for the implementation of the Single Market, develop information flows between institutions, and foster the joint development of institutional networks to sustain long-term collaboration (European Commission 2007;

¹ https://ec.europa.eu/regional_policy/policy/what/investment-policy_en.

Heredero and Olmedillas 2009). For the 1994–1999 period, Interreg operational programmes aimed to foster multi-regional initiatives to reduce barriers between territories (Baños and Iglesias 1995). EU regions gained greater sovereignty in policy design, reinforcing cohesion among them during the following period, 2000–2006 (Plaza 2002). This cohesion continued to be fostered in the 2007–2013 programme period, when actions in EU member states promoted several joint initiatives in different territories, enabling various types of organisations to advance regional policy design and implementation (Reitel et al. 2018). These initiatives continued to grow during the 2014–2020 period. As the EU has expanded, the number of states affected by these programmes under EU Cohesion Policy has also increased, as have the resources invested. In the 2014–2020 period, the Interreg budget represented 2.8% of the total budget of the EU Cohesion Policy (European Commission 2023)². While the 2021–2027 programming period is not part of our analysis (since it is ongoing), the same logic applies, with a budget of 9.9 billion euros—larger than the previous period in relative terms, considering that the withdrawal of the UK.

A broad question regarding ETC relates to its capacity for advancing the objectives of Cohesion Policy; however, given the varied logic underlying the constituent programmes, it remains a major challenge to establish a single indicator that might provide an aggregated answer, as supported by the findings of the European Parliament (2019) and the European Court of Auditors (2025). Consequently, as documented in the literature and highlighted in Sect. 2, scholarship has tended to examine multiple dimensions—such as thematic evaluations (e.g. innovation, environment) and shared territorial challenges within specific programmes or geographic areas—that collectively approximate a response to this overarching issue. Within this context, the present study addresses a notable gap: an exclusive focus on the financial/budgetary execution of Interreg programmes, in particular those of category A, which represent 72.2% of the total budget^{3,4}.

Analysing the budget execution emerges as a relevant step for understanding programme performance, acting as a measurable proxy for the administrative effectiveness highlighted as a relevant precondition for impact in the literature. The direct contribution of the present work therefore lies in offering an analysis of the budgetary dimensions influencing Interreg programmes and the underlying operational dynamics; this includes the introduction of an indicator that assesses programme capacity in allocating and executing budgets, with due consideration for the implications concerning the volume of public funds managed by ETC. This approach aligns with recent calls for enhanced project appraisal and evaluation frameworks (Medeiros 2024) and leverages the examination of financial data from 54 Interreg A programmes to complement existing research on spatial and institutional

² See details at: https://ec.europa.eu/regional_policy/policy/cooperation/european-territorial_en.

³ See details at: <https://interreg.eu/about/types-of-programmes/>.

⁴ Interreg A refers to cross-border programmes, which differ significantly from other Interreg strands that do not focus exclusively on bordering regions; for this reason, other programmes have been excluded. Since they cannot be directly compared, the choice of Interreg A is based on its accounting for the largest share of Interreg funding: for the period 2014–2020, Interreg A, with its 88 programmes, had a budget of 6.6 billion euros, representing 74% of the Interreg budget (8.9 billion euros).

patterns by providing the first comprehensive analysis of the financial architecture of cross-border cooperation. In doing so, it enables the testing of hypotheses rooted in reviewed literature—connecting budget allocation patterns to participant characteristics and correlating execution performance with programme management variables and demographic factors—thereby situating the financial analysis within established theoretical frameworks and contributing to the wider academic discussion on territorial cohesion (Medeiros et al. 2024). In parallel with the broader field of research examining diverse yet complementary programmatic aspects, this study also offers academic support for the improved design and implementation of Interreg programmes.

The central research question guiding this study is which characteristics of Interreg A programmes and their participant organisations determines the level of budget execution. The initial hypothesis is that factors such as the type of organisation and/or its geographical, economic, and institutional context may shape the composition of the programmes in terms of participation. The consequent hypothesis is that this distribution of participation, along with other programme characteristics, including the resources devoted to technical assistance, has an influence in the budget execution.

Taking into account the objectives and analytical rationale of the study, the article is structured as follows. Section 2 reviews the literature on Interreg and its broader policy context, while Sect. 3 outlines the institutional and operational architecture of the programmes. Section 4 details the data sources and scope of the empirical analysis, followed by Sect. 5, which examines participation dynamics, and Sect. 6, which analyses budget execution. Section 7 concludes the manuscript through an aggregated discussion.

2 Literature background

The exploration of ETC, with particular emphasis on its cross-border Interreg A strand, has developed into a diverse and nuanced area of scholarship. Much of the literature prioritises case-study approaches aimed at examining the particular results and governance dynamics found within individual cooperation programmes. These investigations have produced detailed understandings across a range of thematic domains, such as tourism and regional identity (Nilsson et al. 2010), environmental sustainability (Andolina et al. 2021), collaborative climate planning (Brownlee et al. 2021), bioeconomy-related strategies (Mouzakitis and Tsoulfas 2019), cultural industries (Faraone 2022), and noise mitigation (Licitra et al. 2019). Additionally, other studies have focused on the contribution of Interreg to fostering innovation and supporting SMEs (Van den Broek et al. 2020).

A parallel and substantial body of research has taken a territorial approach, focusing on the implementation and impacts of Interreg A within particular border regions. This work has generated in-depth analyses of regions such as the Franco-Spanish border (Harguindéguy 2007; Harguindéguy and Bray 2009; Feliu et al. 2013, 2018; Martín-Uceda and Rufí 2021a), the Portuguese-Spanish border (Feliu et al. 2013, 2018; Martín-Uceda and Castañer 2018; Medeiros 2010), the Nordic border areas

(Medeiros 2010, 2014A, 2014b, 2017; Neubauer et al. 2007; Prokkola 2011), the Estonian-Finnish maritime border (González-Gómez 2018), and the Polish-Slovak border (Kurowska-Pysz et al. 2020). This extensive case-study literature complements broader specific programmatic evaluations (Dühr and Nadin 2007; Pedrazzini 2005), as well as analyses of urban networks (Briot et al. 2021) and discussions on best practices (Vettoretto 2009).

This theoretical framework must also consider the diverse nature of cooperation projects themselves. The literature highlights that projects serve different functions: some create synergies, acting as a catalyst for both ‘soft’ cooperation (such as knowledge and networks) and ‘hard’ cooperation (such as economic collaboration) that might not otherwise occur (Capello et al. 2018a). Others play a complementary role, reinforcing or compensating for existing national policies depending on the specific territorial context (Capello et al. 2018b). This distinction adds a crucial layer to understanding the challenges and governance models of cooperation. These factors vary; for example, cooperation across maritime borders (Interreg A maritime programmes) encounters different logistical, accessibility, and cultural barriers compared to land borders (Cerić 2023). Furthermore, recent research suggests that the concept of ‘cooperation’ itself—often understood as simple coordination and information sharing—is evolving. To tackle complex contemporary challenges, there is a need to shift towards ‘collaboration’, which involves deeper integration, joint action, and shared objectives (Klötters and Pijnenburg 2025).

While this project-specific and regionally focused research has provided valuable insights, it often falls short of delivering a comprehensive, systematic understanding of the Interreg programmes in their entirety. In response to this limitation, more recent studies have aimed to systematically chart cooperation dynamics across Europe. Employing innovative methodologies such as institutional mapping (Chilla and Lambracht 2022) and quantitative analyses of spatial planning initiatives (Decoville and Durand 2021), these investigations seek to elucidate the territorial logic underpinning participation (Esparza-Masana 2020; Esparza Masana and Montemayor-Cejas 2023). These cross-cutting analyses have duly concentrated on spatial, thematic, and institutional facets of cooperation. Nevertheless, a notable lacuna remains in the literature: there is yet no thorough, quantitative, and systematic examination of the financial/budgetary mechanisms driving these programmes.

The gap identified is of critical importance, given that the ultimate aim of the European Cohesion Policy, and by extension Interreg, is to deliver tangible socio-economic impact. However, as frequently observed by critics and evaluators, directly measuring the impact of cooperation in terms of territorial cohesion or economic growth proves to be exceptionally challenging (European Parliament 2020; Medeiros et al. 2024). This difficulty has led to a necessary shift in how programme effectiveness is framed, moving towards a performance-based budgeting approach that differentiates inputs (i.e. budgets), outputs—such as project completion and expenditure-, and outcomes or impacts -long-term socio-economic changes—(Begg et al. 2024). While some studies have started investigating the effectiveness of particular project types, for example solar energy initiatives (Gomez 2016), a fundamental issue remains: the presumed connection between budgetary execution (expenditure) and real-world results is often assumed rather than empirically demonstrated (Medeiros

2024). Indeed, this inherent tension is central to the performance-based budgeting concept, which emphasises the difficulty of progressing from mere expenditure tracking to the actual measurement of performance and impact (Begg et al. 2024).

The literature on the implementation of European Cohesion Policy emphasises that the relationship between financial execution and socio-economic impact is mediated by significant contextual variables, most notably administrative capacity and the quality of governance (Rodríguez-Pose and Garcilazo 2018; Incaltarau et al. 2020; Bachtrögler 2024) assert that high-quality institutions—as defined by the authors—are not only more proficient in absorbing and executing EU funds but also essential in translating these public investments into concrete economic outcomes (Crescenzi et al. 2016; Bachtrögler-Unger et al. 2024). This evidence indicates that financial execution transcends a mere accounting function, serving as a pivotal indicator of the administrative effectiveness necessary to achieve tangible results. Moreover, the literature draws a distinction between technical assistance—entailing short-term, focused support for fund management—and the broader, long-term process of administrative capacity building aimed at strengthening institutional competencies (Luise and Coccozza 2025). Consequently, the allocation of budget to technical assistance within Interreg programmes represents a critical variable for evaluating this administrative dimension.

While the literature clearly establishes that the quality of institutions and administrative capacity are critical determinants of financial execution and its eventual impact (Crescenzi et al. 2016; Incaltarau et al. 2020; Bachtrögler 2024; Bachtrögler-Unger et al. 2024), and recent studies have mapped the spatial and institutional patterns of Interreg A programmes (Chilla and Lambracht 2022; Decoville and Durand 2021), a systematic, multi-programme examination of the financial dynamics remains absent. It is yet to be fully understood how budgets are allocated at the project level or which programme-level characteristics—such as overall budget size, investments in technical assistance, or participant profiles—correlate with successful financial execution.

3 The functioning of interreg and its programmes

To understand the budgetary context of the ETC programmes, it is essential to know how they function. Each programme comprises a specific number of NUTS2 and/or NUTS3 territories. Organisations registered within these territories are eligible to participate in projects, which are formed through partnerships. The programmes are managed by a joint secretariat (JS) and overseen by representatives from the participating member states. The JS is responsible for drafting multiannual operational programmes (OPs) spanning seven years, which must be validated by the member states before submission to the Directorate-General for Regional and Urban Policy (DG REGIO) of the European Commission. Upon approval by DG REGIO, funding is allocated accordingly⁵. These OPs include budget allocations both for the imple-

⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1059>.

mentation of partnership projects by participating organisations and for technical assistance, which covers programme management and support activities.

The execution of the OPs, excluding technical assistance, is conducted through the launch of ‘calls for proposals’. In this process, partnerships—led by one of the constituent organisations—submit projects that address a shared territorial challenge. These projects must align with the thematic focus of the programme, which is explicitly reflected in the OPs. A designated committee evaluates and selects the projects to be awarded, which then receive funding for their implementation.

The projects comprise various activities and actions designed to collectively address a shared territorial challenge specific to the involved regions. Often referred to as ‘solutions’, these initiatives may encompass studies, tests and pilots, capitalisation or expansion of previous actions, among others, depending on the particular programme. Typically, projects have an execution period averaging three years. Common budget categories within these projects include staff costs, administrative expenses, travel, services and subcontracting, and, in some cases, acquisition of equipment and/or infrastructure. Interreg programmes co-finance a portion of the implementation budget, generally ranging from 50% to 85%, depending on the specific programme and characteristics of the territories involved. Partnerships are required to develop budgets aligned with their planned activities, and these budgets must be validated by the programme’s joint secretariat. Expenditure levels close to those forecasts denote effective budget planning. When approving individual project budgets, programme planners must consider that overall programme budget execution depends on the aggregation of these project budgets.

The programmes’ co-financing is provided through the European Structural and Investment Funds (ESIF), which are allocated under the European Cohesion Policy via the European Regional Development Fund (ERDF). Within the utilisation of these funds, three key budgetary concepts are central:

- The *planned budget* refers to the amount approved within the multiannual Operational Programme (OP), representing the budget associated with the action plan submitted by the joint secretariat to the European Commission, which grants approval.
- The *decided budget* denotes the funds awarded to actions and projects, aggregating the budgets of each individual project within a programme, including the allocation for technical assistance.
- The *spent budget* reflects the amount actually executed and disbursed, representing the co-financing share aggregated from all expenditures of all projects under the programme, inclusive of executed technical assistance budgets.

At the end of a programming period, the ERDF spent budget cannot exceed the planned or decided budget. The gap between the decided and spent budgets arises because many projects underspend their allocations. On the other hand, it is not unusual for the decided budget to surpass the planned budget for various reasons. The primary reason is that planners, anticipating common underspending, may allocate funds exceeding 100% of their initial budget to ensure that expenditure approaches 100%; this adjustment can occur either early in the programming period or near its conclusion when underspent funds are reallocated to new calls. Consequently, it

is common to observe that, for certain programmes, the ‘decided’ budget exceeds 100% of the total budget. In some exceptional cases, the actual spent amount may also surpass 100%; nonetheless, DG REGIO limits ERDF subsidy to no more than 100% of the budget, and the additional expenditure would have to be funded by other sources, or the participant organisations. Although the formal programming period was 2014–2020, and all budget lines must be allocated (decided) by the end of this period, expenditure may continue until the end of 2023, during which time minor budgetary adjustments can be made. Achieving full expenditure (i.e. 100%) suggests accurate forecasting and effective programme management in selecting appropriate projects and ensuring their successful implementation.

When distributing the budget during the planning phase, each programme’s joint secretariat takes into account several factors considered in this study. A central factor is geographical distribution; when allocating projects, planners examine the regions of the organisations that will receive funding, along with their institutional context and economic development level. Programme planners also favour projects that incorporate a diversity of regions, in alignment with the objectives of the Cohesion Policy. When reviewing individual project budgets, committees assess various aspects, such as the rationality of the overall amount and its division among budget lines, whether an organisation will coordinate the partnership, and whether the entity is public or private—which can influence the co-financing rate. Finally, programme planners decide what proportion of the total budget is allocated to technical assistance, balancing the needs of management and supplementary activities with the objective of supporting more projects and involving additional organisations in the actual implementation.

This context is crucial for understanding the determinants influencing which organisations participate in the programmes and how the budget is executed through both the projects themselves and the programme managers, under the dynamics analysed in the following sections.

4 Scope of the analysis

As previously introduced, the analysis focuses on the financial implications of Interreg A programmes and projects. The main data source used was that available on keep.eu⁶, which provides data on Interreg programmes and projects. This platform offers raw microdata on participation in these programmes, detailing, through a range of variables to be examined later, the involvement of each organisation in every project under one of the Interreg programmes. For the purposes of this analysis, data from Interreg A programmes for the 2014–2020 period were pooled, and manual adjustments were made, including the removal of duplicate entries and corrections to the territorial classifications of participating organisations. Following this data cleansing process, the resulting database comprised 54 Interreg A programmes, 4399 projects, and 20,833 participations (see definition below). While 60 Interreg A programmes were established for the 2014–2020 period, only 57 were ultimately

⁶ <https://keep.eu/>.

implemented. Furthermore, keep.eu does not provide microdata for the France (Saint Maarten), Greece-Italy, and Hungary-Croatia programmes, which were consequently excluded from the analysis. Therefore, 54 programmes are included.

Each of the 54 programmes comprises multiple projects. Each project is assigned a budget, which is distributed among the organisations in the partnership. The term “participation” refers to each instance in which an organisation is involved in a project; that is, each project has as many participations as partners in that project. An organisation will have as many “participations” as projects in which it is a member of the partnership.

Microdata on participations provided by keep.eu classifies partners territorially according to the EU’s NUTS, with disaggregation at the NUTS3 level. As previously discussed, each programme limits participation to organisations within specific territorial areas, although exceptions may be granted under certain justified circumstances. As a result, each programme includes a different number of NUTS3 regions. Information on NUTS3 GDP per capita and population is pooled from Eurostat datasets to add geographical context to the data.

Data on the institutional quality of territories at the NUTS2 level is also included. The European Quality of Government Index (EQI), developed by Charron et al. (2024), is incorporated. This index is based on a large-scale survey of European citizens concerning their experiences and perceptions of the public sector.

Lastly, the database is further enriched with data obtained from the Open Data Portal for the European Structural and Investment Funds, from which information regarding the progression of budget execution for Interreg programmes has been aggregated since the 2014–2020 programming period.

Table 1 depicts the key variables utilised in this study. It includes variables originally available at the programme level, such as total budget, as well as others derived from aggregating variables observed in the microdata, such as the percentage of public participations. The number of observations for any given variable corresponds to the total number of programmes analysed.

It is observed that most variables display considerable variability. Variables closely associated with programme size—such as the number of participations, projects, territories involved, and total budget—generally exhibit a high coefficient of variation, indicating significant differences among programmes. Similar diversity is apparent at the project level, where the number of participations per project shows substantial dispersion. While a *average population* and *average GDP per capita* of programme regions do not exhibit such high variance, the presence of potential outliers suggests that some programmes encompass regions with distinct geographical characteristics. These differences are also reflected in institutional quality, as *EQI* shows a high degree of variability. In contrast, the percentage of public participations and the proportion of public budget display relatively low dispersion, typically around 20%, consistent with Interreg’s funding policy that offers substantial co-financing rates to public entities.

On average, each participation corresponds to a budget of €0.4 million, though this figure varies significantly across programmes, with the average participation budget ranging from €0.12 million to €1.61 million. Since budget allocation at the participation level is not available for all programmes, the average budget per

Table 1 Description of main variables at a programme-level

Variable	Description	Obs	Mean	SD	VC	Min.	Max.
Projects	Number of projects	54	81.46	42.76	0.52	9	173
Participations	Number of participations	54	385.80	326.96	0.85	9	1,710
Participations/project	Average of participations/project	54	4.76	2.76	0.58	1	12.53
NUTS3	Number of NUTS3 having at least 1 participant organisations in at least 1 project of the programme	54	25.63	19.87	0.78	1	103
Total population	Sum of the population of NUTS3 in the programme (Million people)	54	13.2	10.8	0.82	0.22	49.9
Average population	Average NUTS3 population in the programme weighted by participations (Million people)	54	0.56	0.23	0.41	0.22	1.40
Average GDP per capita	Average NUTS3 GDP in the programme weighted by participations (Thousand €)	54	25.42	7.38	0.29	7.09	39.22
TO s covered	Thematic objectives covered by projects in the programme	54	4.07	1.04	0.26	1	7
% public participations*	Percentage of participations from public organisations	45	73.25	15.24	0.21	30.97	100
% public leader*	Percentage of public project leaders	45	76.84	16.81	0.22	35.44	100

Table 1 (Continued)

Variable	Description	Obs	Mean	SD	VC	Min.	Max.
Total budget	Planned budget of the programme (Million €)	54	163.61	106.51	0.65	16.3	485
ERDF funding	Budget funded by ERDF (Million €)	54	117.55	73.16	0.62	11.7	366
% public funding	Percentage of public (ERDF) budget	54	76.70	11.57	0.15	50	85
Average total budget participation*	Average of budget per participation (Million, Euro)	46	0.41	0.32	0.78	0.12	1.61
Average total budget project	Average of budget per project (Million, Euro)	54	2.04	1.48	0.73	0.53	8.52
Margins	Difference between standardized <i>Average GDP per capita</i> at a project level and <i>Average total budget project</i>	54	0.10	1.01	9.84	-1.83	4.04
EQI	Average NUTS2 EQI in 2017 in the programme weighted by participations	54	0.19	0.79	4.18	-1.49	1.52
% Technical assistance	Percentage of the planned budget allocated to technical assistance	54	6.57	1.85	0.28	3.81	16.09
Decided budget 2020	Percentage of decided budget by the end of 2020	54	100.88	12.62	0.13	50.38	124.37
Spent budget 2023	Percentage of spent budget by the end of 2023	54	88.2	13.51	0.15	35.71	109.21

*Variable not informed for some programmes

Table 2 Participations, leadership and budget allocation by legal status

Variable	Public	Private
Number of total participations	13,624	6388
% of total participations	68.08	31.92
Average of programme % of participation	73.25	26.75
Number of lead partners	2835	898
% of lead partners	75.94	24.06
Average of programme % of project leadership	76.84	23.16
Probability to lead a project	0.21	0.14
% of total budget	74.86	25.14
Average budget per participation*	0.28	0.23

*Lead partners' participations are excluded

project is used in some of the analyses. Each project involves €2.04 million on average, with a coefficient of variation of 0.73, similar to the variation found for the average budget per participation. In relative terms to the size of the programme, the resources allocated to technical assistance per programme show limited variation, although differences do exist.

The variable *margins* is defined as the difference between the standardised *average GDP per capita* at a project level and the standardised *average total project budget*. This variable is computed at the project level because budget allocation at the participation level is not available for all programmes observed. This measure was constructed to analyse whether projects in wealthier regions, potentially with higher costs, receive higher budget allocations, and how these factors relate to programmes' budget execution. Table 1 indicates a large variance of margins at the project level for different Interreg A programmes included in the database.

Furthermore, the table summarises budget execution variables: *decided budget 2020* and *spent budget 2023*. Although the coefficient of variation for these variables is not among the highest, it is important to note they represent proportions of the planned budget, with a maximum of 100%⁷. Therefore, the variability is still considerable. It is already evident that Interreg programmes differ in size, geographic context, the legal status composition of organisations, and budget allocation and execution. The next section analyses the most relevant variables further to better understand the dynamics of participation before performing the analysis of budget execution.

5 Dynamics of participation

Following the observation of aggregate differences in the main characteristics of the programmes, it is instructive to extend the analysis to examine the participa-

⁷ In the summary statistics, it is observed that maximums of variables *decided budget 2020* and *spent budget 2023* overcomes the 100% of the planned budget, these are exceptional cases that will be acknowledged in Sect. 7.

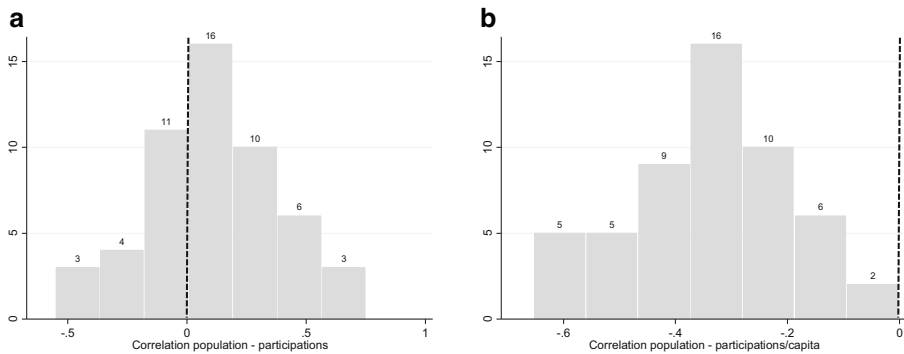


Fig. 1 Relationship between population and participation*

tion dynamics of organisations based on their key attributes, namely legal status, geographical context, and economic level. The term ‘participation dynamics’ refers not only to the mere tally of participations but also to project leadership roles and the budget allocated to each organisation per project. These dynamics are posited to have implications at the aggregate programme level, which may subsequently be associated with its performance in terms of execution.

5.1 Legal status

In order to consider the logic of the participants’ legal status, it must be noted that data on the legal status of organisations are unavailable for nine programmes. Therefore, the analysis focuses on 20,012 participations across 3667 projects within 45 programmes. Table 2 summarises the principal differences in number of participations and leadership between public and private organisations.

The total number of participations and the percentage of total participations, calculated from all entries in the database without distinguishing by programme, indicate that the majority of participations are attributed to public organisations. The average percentage of participations is derived by calculating the proportion of participations from public and private organisations within each programme, followed by calculating the mean for the 45 programmes analysed. It is observed that the average participation rate for public organisations exceeds 70%, thereby confirming a higher level of engagement from public organisations when analysed on a programme-specific basis.

Similarly, project leadership is predominantly concentrated within public organisations, a trend likely linked to their greater representation among participants. To quantify this phenomenon, the probability of leading a project is defined as the ratio of lead partners to the total number of participations. The findings show that this probability is higher for public organisations. A proportion test further indicates that, in 32 out of the 45 programmes, public entities are more likely to assume leadership roles. This demonstrates that project leadership is largely concentrated among public organisations.

Table 3 Correlations between budget, margins, and GDP per capita

	GDP per capita Participation	Project	Programme
Budget	-0.002	0.096***	0.124
Margins	-0.709***	-0.674***	-0.662***
Obs	18,867	4,392	54

Note: *** Significant for $\alpha=0.00$

Consistent with the participation figures, approximately 75% of the total budget across all programmes is allocated to public organisations. On average, public organisations also receive a higher budget per participation. This trend holds true programme by programme, with the exceptions of Estonia-Latvia and Germany/Bavaria-Czechia. In calculating the average budget per participation, lead partner participations are excluded, as lead partners coordinate projects, undertaking greater responsibilities and thus larger budgets. On average, lead partner participating organisations receive €0.64 million compared to €0.27 million for other participants.

In summary, public organisations tend to participate in more projects, take on more leadership roles, and secure a larger share of the budget, both in absolute and relative terms. Given that Interreg programmes aim to promote policy cohesion by engaging organisations with impactful capacities, this pattern is justifiable.

5.2 Population

Another key factor is the geographical distribution of participating organisations. An initial focus of the analysis is to determine whether participation tends to be concentrated in NUTS3 regions with higher or lower population densities. To this end, the number of participations for each NUTS3 region is calculated, and the correlation coefficient between the population of each NUTS3 region and the number of participations within each programme is computed, resulting in 53 correlation coefficients, their distribution is presented in Fig. 1. The left-hand side of the figure displays the histogram for the correlation coefficients between NUTS3 participations and population size, while the right-hand side shows the correlation using participations per capita (i.e., participations relative to population). This approach enables an assessment of whether participation is driven by regional population size or whether smaller regions are disproportionately involved in Interreg programmes.

In both panels the coefficients follow a quasi-normal distribution, however the centre of the distribution is clearly different. In panel A most correlations are positive, though many are close to zero, and only in 11 cases is the positive correlation statistically significant. This explains this centre of the distribution close to 0, hence there is only weak evidence of a positive relationship between participation and population. Nevertheless, as shown in panel B, when considered on a per capita basis, all correlations are negative, with 26 of these being statistically significant. This indicates that, in relative terms, smaller NUTS3 regions are overrepresented among participants. Such a pattern is consistent with the prioritisation of projects that promote balanced territorial distribution, a common feature of Interreg programmes (Esparza Masana and Montemayor-Cejas 2023).

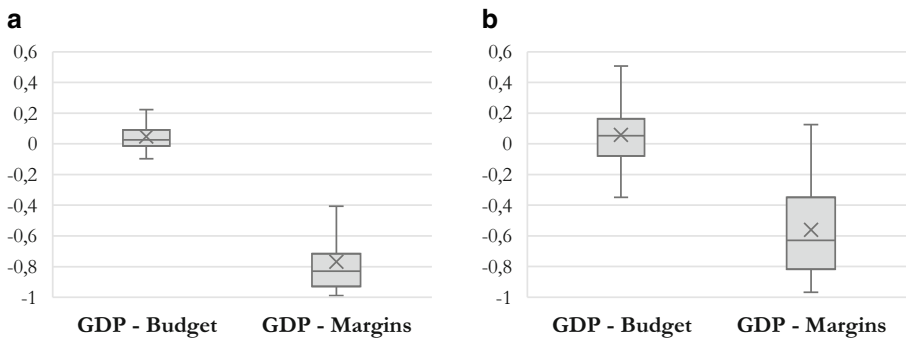


Fig. 2 Correlation coefficients between GDP per capita vs budget/margins. Note: for participations, 1 outlier discarded, no outliers found in projects

Additionally, both for the whole database and at the programme level, an analysis was conducted to determine whether project leadership and budget allocation tend to be concentrated in the most populous NUTS3 regions relative to other project participants and no discernible pattern was observed in this regard.

5.3 Economic development

Firstly, the same analytical approach than for population was applied to examine the relationship between the GDP per capita of NUTS3 regions and both participation and participation per capita. No clear trend emerged from this analysis; wealthier and less affluent territories appear equally likely to participate. This may reflect the intention of programme planners to ensure a balanced geographical distribution of NUTS3 regions within each project, prioritising the resolution of shared territorial challenges across borders, irrespective of economic development levels. No clear pattern was found in terms regarding leadership either.

As explained in Sect. 3 when deciding whether to shape or join a project, organisations, alongside the relevance of the thematic focus, prioritise budgetary considerations. A question that arises is whether budgets account for the economic context of participating organisations, which can be approximated using the GDP per capita of the region in which the entity is located. Since regions with higher GDP per capita tend to face greater costs in developed countries (Balassa 1964; Hassan 2016), a positive relationship is hypothesised between this variable and the budget allocated to partners.

To analyse this potential relationship, the first row of Table 3 presents the correlation coefficients between GDP per capita at three levels. In the left-hand column, each participation is represented by the budget received by the organisation and the GDP per capita of its corresponding region. In the middle column, each observation corresponds to a project, defined by its total budget and the average GDP per capita of the participating organisations. In the right-hand column, aggregation is conducted at the programme level, with each observation reflecting the total programme budget and the average GDP per capita across its participants.

Although a positive relationship is observed, the correlation coefficient indicates no strong association between budget allocation and regional economic status, suggesting systematic compensation for cost differences tied to economic disparities is absent. While a statistically significant positive correlation is identified at the project level, its magnitude remains modest.

To visualise the absence of cost compensation, the second row of Table 3 analyses the variable *margins*. As introduced earlier, *margins* represent the difference between the budget allocated and the standardized GDP per capita of an organisation's region, with both values normalized to a standard normal distribution $N(0,1)$. This variable reflects relative margins at each aggregation level. The table shows a clear negative relationship between margins and GDP per capita at all levels, indicating that organisations in wealthier regions do not receive proportional compensation for their higher costs. Practically, this means organisations from less affluent regions tend to gain relatively greater economic benefits from Interreg programmes. Given that Interreg is part of the European Commission's cohesion policy, this finding aligns with policy objectives by reducing financial incentives for organisations in economically stronger territories.

To account for potential variations across programmes, the correlation coefficient between GDP per capita and budget allocation, as well as relative margins, was calculated for each programme at both the participation and project levels. Figure 2 presents a boxplot of these correlation coefficient values across all programmes, displayed at both levels, providing an overview of the distribution of these relationships. The findings observed across the entire dataset are reinforced: the correlation coefficients between economic level and budget allocation cluster around zero, while the correlation between economic level and benefits remains negative.

This analysis reveals that Interreg A budget allocations do not systematically compensate for regional economic disparities, with wealthier regions receiving proportionally smaller margins despite higher costs. This aligns with cohesion policy objectives, prioritising relative benefits for less affluent areas.

5.4 Institutional quality

To assess the relationship between institutional quality—measured by the *EQI*—and participation dynamics (in terms of participations, participations per capita, leadership, and budget allocation), an analysis was conducted using the entire database

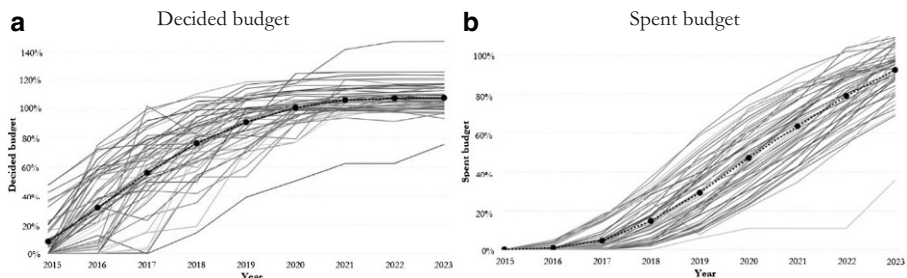


Fig. 3 Programmes decided/spent budget evolution

on a programme-by-programme basis at the NUTS2 level, as this is the territorial unit for which these indicators are calculated. Although some significant negative correlations emerge between the average budget and the *EQI*, this value is very moderate (correlation coefficient = -0.212). Furthermore, when analysed on a programme-by-programme basis, no clear pattern is confirmed. Thus, no conclusive results are found suggesting that the institutional quality of the territories is associated with a higher number of participations, greater project leadership, or a larger budget allocation.

What emerges clearly, however, is that *EQI* are positively correlated with GDP per capita, which is in line with the findings of Rodríguez-Pose and Garcilazo (2018) and Santos et al. (2025). These results are corroborated by the correlation matrix in Table 6, using the variables calculated as the average for the territories constituting the programmes.

This section has examined how participation is distributed based on the characteristics of the organisations and their territorial context. It has become clear that there is a greater presence of public organisations in every respect, and that smaller territories account for more participations in relative terms. This is possibly due to an implicit requirement for territorial distribution when projects are formed. This factor is also consistent with the results indicating no apparent relationship between participation and economic level or institutional quality.

6 Budget execution

Building upon the preceding analysis of participation dynamics in Interreg programmes, this section assesses which of these factors are most closely associated with budget execution performance at a programme level. The level of execution represents an indicator of how well it is planned and managed, and it also affects the financial prospects of the programme in future programming periods. Therefore, achieving balanced ratios between planned and executed budgets should be regarded as an element of effective implementation. As has been noted, the primary aim of this work is to ascertain the effectiveness of budget execution for Interreg under the EU's Cohesion Policy and to identify the determinants of disparate execution levels among the various programmes.

Following the definitions of the different phases of budget execution explained in Sect. 3, panels A and B of Fig. 3 show the evolution of the *decided* and *spent budget*, respectively. As noted in Table 1, these figures are always expressed as a percentage of the total planned budget. Each line represents a programme, while the bold dashed line indicates the average for all programmes. The first notable finding is that programme budgets are not being fully executed. Panel A shows that by the end of 2020, the deadline for deciding the budget, 22 programmes still fall short of a 100% *decided budget*, despite a clear trend towards this figure. Nevertheless, considerable variability exists among programmes, with a standard deviation of 12.62 percentage points (hereafter, pp), which the subsequent regression analysis will seek to explain. As shown in Panel B, this lack of execution is even more pronounced for the *spent budget*. By the end of 2023, the average is 88.62%, with 42 of the 54 programmes

analysed failing to reach the 100% mark. The standard deviation 13.51 pp, a higher value than for the *decided budget*, which the analysis will also aim to explain.

In Fig. 3 it can also be observed that the 100% threshold for the *decided budget* and the *spent budget* are sometimes exceeded. This may be due to the reasons described in Sect. 3. However, both variables are capped at 100% in the subsequent regression analysis to avoid potential biases.

In an effort to explain the variations in the two phases of budget execution, two OLS models are estimated, with the *decided budget* and the *spent budget* as the respective dependent variables. The first model is specified as follows:

$$\text{Decided budget 2020}_i = \beta * X_i + u_i \quad (1)$$

The *decided budget 2020* is selected as the dependent variable because, as previously mentioned, this was the target year for deciding 100% of a programme's planned budget. The term X_i represents a set of variables that characterise the programme and its geographical context. These variables, described earlier, have been noted in previous sections as being important for understanding budget execution. Table 3 presents the estimation results. All available variables presented in Table 1 are used, except for those where data were not available for different programmes⁸.

Given that the regressions are based on a limited number of observations, a cautious approach was adopted to avoid multicollinearity issues. Following Hair et al. (2009), correlation coefficients greater than 0.7—in absolute terms—between regressors were not permitted, and the maximum allowable Variance Inflation Factor (VIF) was set at 5⁹. The appendix presents the correlation matrix for the available programme-level variables.

Table 4 presents the results for three different specifications. This is necessary because the *margins* variable is constructed from *average GDP* and *average total budget project*, and their simultaneous inclusion in the same regression is therefore avoided. Furthermore, *EQI* and *average GDP*, owing to their high correlation.

The results indicate that some variables have a statistically significant association with the *decided budget* across all the specifications. First, the share of the budget allocated to technical assistance is positively correlated with budget execution. A one-percentage-point increase in the budget share for technical assistance is linked to an increase of approximately one percentage point in the *decided budget*. A possible interpretation of this finding is that greater resources for technical assistance, which often funds programme management and coordination activities, may contribute to a more effective budget deciding process, as claimed by Luise and Coccozza (2025).

Secondly, programmes with larger total budgets appear to have higher levels of budget execution. Specifically, a one-million-euro increase in the total programme budget is associated with an approximate 0.06 pp increase in the *decided budget*. Therefore, larger programmes are correlated with a higher proportion of their budget being decided.

⁸ This is the case for the variables *% public participations* and *% public leader*.

⁹ *NUTS3*, *ERDF funding*, *Participations* and *Participations/project* are discarded for this reason.

Table 4 Factors associated with the decided budget

	(a)	(b)	(c)
Projects	−0.001 (0.034)	−0.051 (0.062)	−0.027 (0.054)
TOs covered	1.810 (1.284)	2.362 (1.602)	1.942 (1.480)
Total budget	0.050* (0.026)	0.066* (0.039)	0.059* (0.034)
% ERDF funding	0.184 (0.146)	0.211 (0.163)	0.103 (0.141)
% Technical assistance	1.143** (0.476)	1.052** (0.449)	1.019** (0.438)
Average population	−10.219* (5.485)	−7.989 (5.541)	−12.124** (5.976)
Margins	−4.267 (3.309)	−	−
Average total budget project	−	−3.48E-06 (2.54E-06)	−2.74E-06 (2.25E-06)
Average GDP	−	−	0.469* (0.276)
EQI	1.562 (1.651)	5.530** (2.388)	−
<i>Obs</i>	54	54	54
<i>R</i> ²	0.370	0.387	0.375
<i>Mean VIF</i>	2.04	2.28	2.11
<i>Max VIF</i>	2.64	3.61	3.51

Note: robust standard errors in parentheses. ***, **, * significant at $\alpha = 0.00$, $\alpha = 0.05$ and $\alpha = 0.1$, respectively

The institutional quality indicator, *EQI*, is found to exhibit a positive coefficient, though it is only statistically significant in the second specification. It could be posited that in the first estimation, there might be some form of masked multicollinearity not detected by the *VIF* or the correlation matrix. This is conceivable due to the presence of the *margins* variable, which is constructed using *average GDP*, a variable highly correlated with *EQI*. Conversely, in the third model, *average GDP* is statistically significant. Thus, up this point, it is not possible to discern whether the budget's association is with institutional quality or with the economic level.

Additionally, it is observed that programmes involving participant organisations from more highly populated territories tend to show lower levels of budget execution, as measured by the *decided budget*. Although in specification (b) the coefficient falls just short of statistical significance (p -value=0.156), the direction of the coefficient is consistent across all specifications. More precisely, a one-million-person increase in the average population of a programme's participating territories is associated with a reduction of between 8 and 12.2 pp in the *decided budget*. This finding may be related to the analysis in Sect. 3.3, where it was observed that less populated territories are relatively overrepresented. Furthermore, Esparza Masana and Montemayor-Cejas (2023) found that partners from less populated territories have a higher likelihood of repeated participation. This suggests that partners from smaller regions may possess greater expertise in Interreg projects, which could facilitate more effective budget execution.

Table 5 Factors associated with the spent budget

	(a)	(c)	(d)
Decided budget	0.701*** (0.196)	0.646*** (0.179)	0.733*** (0.187)
Projects	0.063* (0.034)	0.036 (0.045)	0.040 (0.046)
Total budget	-0.017 (0.013)	-0.003 (0.016)	-0.008 (0.017)
% ERDF funding	0.020 (0.128)	0.029 (0.135)	-0.118 (0.118)
% Technical assistance	-0.441 (0.652)	-0.369 (0.639)	-0.625 (0.650)
Average population	-8.306 (5.392)	-8.654 (5.754)	-11.856** (5.834)
% SSR population	14.591*** (4.853)	14.170*** (4.667)	12.309** (4.814)
Margins	-0.133 (1.577)	–	–
Average total budget project	–	-1.244 (1.131)	-0.732 (1.283)
Average GDP	–	–	1.62E-04 (1.66E-04)
EQI	4.182* (2.433)	4.682** (2.197)	–
<i>Obs</i>	54	54	54
<i>R</i> ²	0.605	0.614	0.576
<i>Mean VIF</i>	2.06	2.19	2.04
<i>Max VIF</i>	3.21	4.06	4.04

Note: robust standard errors in parentheses. ***, **, * significant at $\alpha = 0.00$, $\alpha = 0.05$ and $\alpha = 0.1$, respectively

Following the analysis of factors related to the *decided budget*, the same exercise is now repeated for the second phase of budget execution for Interreg programmes, namely, the *spent budget*. The model to be estimated is as follows:

$$\text{Spent budget 2023}_i = \beta_1 * \text{Decided budget 2020}_i + \beta_2 * X_i + u_i \quad (2)$$

As the budget must be fully spent by 2023, the *spent budget* for that year is selected as the dependent variable. This model is very similar to (1), but it also includes the *decided budget 2020* as a regressor, since deciding the budget is a necessary condition for it to be spent. The variable selection follows the same criteria as in the previous regression, although the *TOs covered* variables are excluded, as they are not relevant for the spending phase once a project has commenced. Additionally, a new variable is introduced: *% SSR Population*. This variable measures the degree of variation among project partners in population at the NUTS3 level to analyse the relationship between partners' heterogeneity and budget execution. Table 5 shows the results of the three estimations, one for each specification, as in the previous analysis.

Regarding the *spent budget*, as might be expected, the *decided budget* is a key factor; higher levels of budget deciding are strongly associated with higher levels of final expenditure. Specifically, a one-percentage-point increase in the decided budget by the end 2020 is associated with an approximate increase of 0.7 pp in the spent budget by the end of 2023.

Secondly, another variable showing a statistically significant correlation with execution levels relates to population. Greater diversity in population sizes among project participants is observed to be positively correlated with budget execution. A one-percentage-point increase in the *% SSR population* is associated with an in-

crease of more than 10 pp in the *spent budget*. This suggests a potential link between a diverse mix of territories (in terms of population) and higher execution rates.

The previous finding—that programmes involving partners from more populated territories tend to show lower execution rates—is reinforced here. Although the coefficients are not statistically significant in specifications (a) and (b), they both approach significance (p -value < 0.15). An increase of one million people in the average population of participating territories is associated with a reduction of between 8.3 and 14.6 percentage points in the *spent budget*. As previously mentioned, a possible explanation is that partners from smaller regions may possess greater experience in Interreg projects, which in turn could be a factor in achieving higher budget execution.

In this case, the *EQI* is found to be positively correlated with budget execution, and a 1-unit increase in this variable is associated with an increase of between 4.1 and 4.7 pp in the *spent budget*. In this analysis, the positive correlation between the average institutional quality of the programmes and budget execution is unequivocal. This aligns with existing literature, which posits an association between higher institutional quality and enhanced budgetary absorption capacity (Rodríguez-Pose and Garcilazo 2018; Incaltarau et al. 2020; Santos et al. 2025).

In summary, planned budget is not being fully either evenly executed by all the Interreg A programmes. The analysis in this section suggests an association between budget execution and several key factors, including programme size, investment in technical assistance, and the demographic profile of participating regions. Larger budgets, higher investment in management structures, low-populated territories, high-quality institutions and diverse mix of territories are correlated with higher execution rates. This finding may suggest the importance of considering these contextual factors when designing programme management strategies to support financial performance.

7 Discussion and final remarks

This article presents a quantitative analysis of the financial dynamics underpinning the Interreg A programmes for the 2014–2020 period. This work moves beyond the predominant case-study or spatial-planning focus in the literature, addressing a distinct gap by leveraging microdata from 54 programmes to provide a novel systematic, cross-programme examination of the financial architecture of cross-border cooperation. The main objective of the research is to determine which characteristics of Interreg A programmes, and their participant organisations, are associated with budget execution levels. This objective is guided by the hypothesis that factors such as organisational type and its geographical, economic, and institutional context shape the composition of programme participation, and that this participation structure, alongside other programme characteristics is subsequently associated with budget execution.

The findings confirm that public organisations dominate programme participation and leadership, securing a larger budget share than private entities, consistent with expectations given their policy influence and capacity (Capello et al., 2018b; Luise

and Coccozza 2025). Geographically, smaller territories were disproportionately represented relative to population size, supporting programme planners' prioritisation of balanced territorial cohesion (Esparza Masana and Montemayor-Cejas 2023). No strong association was found between participation or leadership and regions' economic development or institutional quality, yet organisations from affluent areas receive relative lower budget margins, in line with cohesion policy goals of reducing territorial disparities (European Commission 2022; Crescenzi et al. 2016).

With respect to budget execution, results highlighted technical assistance investment and total programme budget size as positive correlates of effective budget decision-making. This corroborates prior literature that emphasises administrative capacity and management support as essential for financial absorption (Rodríguez-Pose and Garcilazo 2018; Luise and Coccozza 2025). Moreover, programmes including participants from lower-population regions, as well as partnerships exhibiting varied population sizes, achieved higher execution rates. This may reflect enhanced local expertise and experience in smaller territories facilitating efficient project implementation. Additionally, institutional quality (measured by the European Quality of Government Index) emerged as a robust positive correlate with actual budget expenditure, reinforcing the importance of governance quality in translating allocations into tangible outputs (Bachtrögler-Unger et al. 2024; Santos et al. 2025). Overall, the study reveals that budget execution in Interreg programmes is shaped by intertwined institutional, demographic, and management factors, integrating and extending insights from earlier focused case studies and broader policy evaluations (Medeiros et al. 2024; Begg et al. 2024).

The results confirm that certain characteristics of the programmes and their participating organisations are associated with the level of effectiveness in budget execution. This leads to significant policy implications in the context of Interreg A programmes and their management. The positive association between investments in technical assistance and successful budget execution underscores the necessity for policymakers to prioritise adequate resourcing in programme administration.

The results provide programme planners with valuable insights into which specific factors facilitate or hinder the execution of programme budgets, both in terms of allocation and expenditure. These lessons are crucial considerations for the planning of the upcoming 2028–2034 programming period. The fact that technical assistance emerges as a key determinant also highlights the necessity for policymakers to prioritise adequate resources for programme administration. Another important takeaway is the emphasised relevance of institutional quality, which planners can incorporate when designing future programmes. Together with other findings and in conjunction with existing literature on various Interreg domains, these insights offer robust support for shaping future programmes aimed at enhancing their efficiency and impact.

However, this study is subject to some limitations that should be acknowledged to contextualize the findings and guide future research. Given the aim to provide a homogeneous overview of Interreg A programmes as a whole, this study lacks the granular, qualitative insights necessary to fully capture governance dynamics. Although the estimations show robust and significant correlations, the methodology employed and the limited sample size mean that causality cannot be claimed, so

conclusions must be drawn with caution. Finally, the results in isolation have value only on the specific analysis context but, in order to discuss further aspects of impact, they should be interpreted within the broader context of existing literature, which addresses complementary aspects and, when considered collectively, aids in analysing the programmes' overall impact.

Future research should incorporate upcoming programming periods as these become available, thereby allowing for the confirmation of the findings and observed trends identified in this study. A more micro, project-level analysis would complement the results; if the Interreg database expands to include execution data on a project-by-project basis, this would enable deeper insights, would the keep.eu platform facilitate such detailed reporting in the future. Furthermore, attempts should be made to synthesise our results with those from other analytic domains found in the literature, possibly through a comprehensive review that seeks to integrate findings from diverse studies. Such an approach could help elucidate the broader implications of Interreg programmes' impact, providing a more holistic understanding of their effectiveness.

8 Appendix

Table 6 Correlation matrix

	% de- cided bud- get 2020	% spent bud- get 2023	NUTS3	Parti- cipa- tions	Projects	Parti- cipa- tions/ pro- ject	Total popu- lation	TOs cov- ered	Total bud- get	ERDF fund- ing	% ERDF fund- ing	% Tech- nical assis- tance	Aver- age GDP	Aver- age popu- lation	% SSR popu- lation	Average total bud- get project	Mar- gins	EQI
% decided budget 2020	1***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% spent budget 2023	0.666***	1***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NUTS3	0.267*	0.291**	1***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Partici- pations	0.233*	0.277**	0.790***	1***	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Projects	0.288**	0.224	0.335**	0.610***	1***	-	-	-	-	-	-	-	-	-	-	-	-	-
Partici- pations/ project	0.198	0.244*	0.729***	0.701***	-0.016	1***	-	-	-	-	-	-	-	-	-	-	-	-
Total popula- tion	0.230*	0.189	0.856***	0.799***	0.434***	0.667***	1***	-	-	-	-	-	-	-	-	-	-	-
TOs covered	0.092	-0.004	0.061	0.261*	0.412***	0.108	0.324**	1***	-	-	-	-	-	-	-	-	-	-
Total budget	0.266*	0.150	0.664***	0.658***	0.476***	0.456***	0.721***	0.142	1***	-	-	-	-	-	-	-	-	-
ERDF funding	0.250*	0.097	0.491***	0.522***	0.465***	0.323**	0.599***	0.156	0.941***	1***	-	-	-	-	-	-	-	-

Table 6 (Continued)

	% de- cided bud- get 2020	% spent bud- get 2023	NUTS3	Partici- pations	Projects	Parti- cipa- tions/ project	Total popu- lation	TOs cov- ered	Total budget	ERDF fund- ing	% ERDF fund- ing	% Tech- nical assis- tance	Aver- age GDP	Aver- age popu- lation	% SSR popu- lation	Average total budget project	Mar- gins	EQI
% ERDF funding	-0.124	-0.142	-0.493***	-0.384***	-0.142	-0.334**	-0.431***	-0.120	-0.351***	-0.054	1***	-	-	-	-	-	-	-
% Tech- nical assis- tance	0.011	-0.055	-0.305**	-0.250*	-0.211	-0.157	-0.355***	-0.213	-0.392***	-0.375***	0.126	1***	-	-	-	-	-	-
Average GDP	0.311**	0.328**	0.407***	0.195	-0.012	0.277**	0.274**	-0.018	0.124	-0.031	-0.455***	-0.242*	1***	-	-	-	-	-
Average popula- tion	0.026	-0.081	0.224	0.388***	0.366***	0.205	0.579***	0.546***	0.468***	0.447***	-0.164	-0.381***	0.127	1***	-	-	-	-
% SSR popula- tion	0.139	0.309**	0.443***	0.452***	-0.080	0.743***	0.425***	0.065	0.224	0.232*	0.119	-0.069	0.078	0.184	1***	-	-	-
Average total budget project	-0.202	-0.227*	0.271**	0.043	-0.351***	0.289**	0.226	-0.121	0.412***	0.379***	-0.222	-0.115	0.046	0.028	0.078	1***	-	-
Margins	-0.370***	-0.407***	-0.156	-0.127	-0.199	-0.052	-0.076	-0.084	0.166	0.274**	0.233*	0.128	-0.786***	-0.091	-0.020	0.578***	1***	-
EQI	0.263*	0.343**	0.336**	0.092	-0.019	0.085	0.187	-0.153	0.129	-0.054	-0.633***	-0.148	0.741***	-0.109	-0.003	0.202	-0.472***	1***

Note: pairwise correlation coefficients. ***, **, * significant at $\alpha=0.00$, $\alpha=0.05$ and $\alpha=0.1$, respectively

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