STUDY

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Effectiveness of cohesion policy: learning from the project characteristics that produce the best results

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DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT D: BUDGETARY AFFAIRS

Effectiveness of cohesion policy: Learning from the project characteristics that produce the best results

STUDY

Abstract

This study analyses the characteristics of cohesion policy projects that can contribute to successful outcomes. Our analysis is based on a literature survey, an econometric analysis and interviews with stakeholders. About two dozen project characteristics are considered, and their association with economic growth is studied using a novel methodology. Based on the findings, the study concludes with recommendations for cohesion policy reform.

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CONTENTS

LIST OF ABBREVIATIONS

CF	Cohesion Fund
CSR	Country-specfic recommendation of the European Semester
EAFRD	European Agricultural Fund for Rural Development
ECA	European Court of Auditors
EMFF	European Maritime and Fisheries Fund
ERDF	European Regional Development Fund
ES	European Semester
ESF	European Social Fund
ESIF	European Structural and Investment Funds
EUCP	European Union cohesion policy
GDP	Gross domestic product
GNI	Gross national income
ICT	Information and communication technologies
MEP	Member of the European Parliament
MFF	Multiannual Financial Framework
NGO	Non-governmental organisation
NUTS	Nomenclature of Territorial Units for Statistics
OP	Operational programme
PF	Performance Framework
PPS	Purchasing power standards
SCO	Simplified cost option
SGP	Stability and Growth Pact
SME	Small and medium-sized enterprizes

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EXECUTIVE SUMMARY

Background

Cohesion policy, the European Union's primary tool for promoting economic convergence, is set to be reformed. The European Commission proposed a revised framework for cohesion (and regional) policy in the next EU Multiannual Financial Framework (MFF) for the seven-year period from 2021 until 2027. The proposal is the subject of intense debate. This study contributes to this debate based on a literature review, empirical research and interviews with various stakeholders.

Outcome

As an introduction, this study highlights that:

- A treaty-based objective of the European Union is to reduce disparities between the levels of development of various regions, and the backwardness of the least-favoured regions.
- Cohesion policy has various social (fostering equality), political (honouring enlargement agreements) and economic (creating conditions that allow regions adversely affected by the single market to prosper) rationales. It also supports the EU's inclusive, smart, green and sustainable development priorities.
- In the literature, there is no conclusion on the impact of cohesion policy, partly because of major methodological and data complications.
- This study uses a novel methodology that contrasts the characteristics of cohesion projects in the best and worst performing regions of EU countries.
- This study is not a formal evaluation or audit of cohesion policy. Its goal is to advise Members of the European Parliament when assessing the implementation of the current MFF and considering the next generation of programmes for the next MFF.

Chapter 2 surveys the literature. We have identified more than 1,000 papers dealing with various aspects of effectiveness, convergence, inequality, governance and many other topics. While many papers deal with effectiveness and related issues, we have found few papers that assess the characteristics of successful programmes and projects, suggesting that our own work is novel. Our key conclusions from the literature survey are:

- There is a broad range of literature on cohesion policy, which is inconclusive: some papers find positive long-term impacts, others find positive but only short-term impacts, while others find no impact at all or even negative impacts.
- The diversity of results arises from major complicating factors, related to complex local environments, the diversity of policy interventions beyond cohesion policy, varying time frames, cross-regional spill-over effects and lack of appropriate data for the analysis, partly because certain important factors, which influence the outcome of cohesion policy, are not measurable.
- Various econometric problems and related estimation biases further complicate the analysis.
- Very few studies have analysed the characteristics of successful programmes and projects.
- The early literature on the EU's Performance Framework highlights various risks and drawbacks.

Chapter 3 presents our empirical analysis. As our literature survey highlights, there are major problems with existing methodologies. Therefore, we have used a novel approach, rather than a standard methodology. We study around two dozen project characteristics, leading to a wide range of interesting results. Our main findings are:

- Because of econometric problems with standard methodologies used in the literature, we adopted a novel methodology that first estimates 'unexplained economic growth', by controlling for the influence of various region-specific factors, and then analyses its relationship with about two dozen project-specific characteristics.
- Among the EU funds (ERDF, EARDF, ESF and CF), only the CF is positively associated with unexplained economic growth. The relative importance in a region of interregional projects (part of the ERDF) is also robustly associated with higher unexplained economic growth.
- Lower national co-financing rates are correlated with higher unexplained economic growth, as are higher proportions of non-research NGOs and private-sector entities among the beneficiaries (as opposed to public-sector beneficiaries).
- The best-performing regions have longer duration projects, while the budgets of programmes in the best-performing regions are more concentrated on a few priorities. These findings suggest that strategic and focused programmes and projects have benefits.
- The best-performing regions have more inter-regional projects.
- National management of projects is more widespread in countries that have more best-performing regions in Europe.
- The role of different sectors in unexplained economic growth is ambiguous, hinting that the success of sectoral investments is highly dependent on regional characteristics.

Chapter 4 summarises our interviews with relevant stakeholders from the European Commission, national ministries, municipalities and independent experts. These interviews shed light on various aspects of cohesion policy design, implementation, effectiveness and desirable reforms that we cannot analyse by using data, either because the data are unavailable or of their qualitative nature. A number of common observations were made by several interviewees, but there were also several aspects on which interviewees had different opinions. The most important lessons from the interviews were:

- Cohesion policy is assessed to be the most evaluated of all EU policies, and to generate European value added.
- In some countries, local stakeholders have different attitudes towards cohesion and national funds, which sometimes lead to less careful management of EU funds.
- The Performance Framework is found to bring an additional layer of administrative burden, without a clear connection to results and the quality of interventions.
- Beyond the crucial role of administrative capacity and institutional quality, there are no clear-cut characteristics that contribute to the success of cohesion programmes.
- Interviewees made various suggestions on how to improve cohesion policy in the 2021-2027 MFF, including a stronger focus on addressing the underlying problems, more strategic planning, simplification, stricter control when the corruption risk is high, synergies with other EU and national programmes, and more cross-region, cross-border projects and a stronger focus on fewer European goals in the case of more-developed regions.

Chapter 5 concludes by drawing out the implications for cohesion policy reform from the results of our literature survey, empirical analysis and interviews. The main points are:

- The overall allocation of EU resources to cohesion policy and other priorities is a political issue and, therefore, we do not make a recommendation, although we note that continued convergence reduces the need for cohesion funding.
- Within the cohesion envelope, we found growth-enhancing effects only for the Cohesion Fund. The proposed drastic reduction of this fund should, therefore, be assessed on the basis of a clarification of the importance of economic convergence and other goals, such as social inclusion and the protection of the environment.
- The national co-financing rate should be set on the basis of fiscal constraints, the additionality principle and corruption risk. We welcome the InvestEU initiative, through which a single project can raise financing from financial instruments, grants and private and public funds, thereby tackling financing constraints.
- Our study signals a negative correlation between economic growth and the proportion of projects under management by local entities. A way of reconciling this finding, with the greater involvement of local bodies, would be to couple locally led demand for projects, driven by more accurate knowledge of local needs and deficiencies, with higher-level allocation, oversight and management.
- Thematic concentration, along with fewer EU goals, is well justified in more-developed regions, but not in less-developed regions. Irrespective of the degree of thematic concentration, individual projects should be focused and have longer durations, in line with long-term strategic planning. Such an approach does not necessitate a high level of flexibility of cohesion policy.
- A strengthened link with the European Semester should be avoided.
- Interregional projects should be further encouraged.
- A focus on results and simplification should be a major aim of the reform, alongside increased transparency of data and indicators on the design and implementation of projects.

Annex 1 presents a summary of selected articles from the literature, Annex 2 reports our full econometric analysis in detail, Annex 3 compares our findings for NUTS-2 and NUTS-3 regions when using an inter-regional dataset, Annex 4 studies the robustness by excluding more-developed regions from the analysis and Annex 5 specifies our data sources and data adjustments.

SYNTHÈSE

Contexte

L'Union européenne prévoit de réformer son principal instrument de convergence économique, la politique de cohésion. La Commission européenne a proposé un cadre révisé pour la politique de cohésion et la politique régionale dans le cadre financier pluriannuel (CFP) de l'Union pour la période 2021-2027. Cette proposition fait l'objet d'un débat intense, auquel la présente étude se veut une contribution. Elle s'appuie sur un état de l'art dans la littérature existante, des études empiriques ainsi que des entretiens avec différents acteurs de la politique de cohésion.

Résultats

L'introduction de l'étude souligne les points suivants:

- D'après les traités, l'un des objectifs de l'Union est de réduire l'écart entre les niveaux de développement des diverses régions et le retard des régions les moins favorisées.
- La politique de cohésion présente diverses motivations d'ordre social (renforcer l'égalité), politique (respecter les accords d'élargissement) et économique (créer des conditions favorables à la prospérité des régions que le marché unique désavantage). Cette politique va également dans le sens d'un développement inclusif, intelligent, écologique et durable, qui fait partie des priorités de l'Union.
- La littérature existante ne permet pas de tirer de conclusions quant aux effets de la politique de cohésion, en partie en raison de difficultés majeures concernant la méthodologie et les données.
- La présente étude adopte une méthode inédite consistant à comparer les caractéristiques des projets de cohésion mis en place dans les régions européennes les plus performantes et les moins performantes.
- Il ne s'agit pas formellement d'une évaluation ou d'un audit de la politique de cohésion. Son objectif est d'aider les députés au Parlement européen à évaluer la mise en œuvre du CFP actuel et à planifier la nouvelle génération de programmes pour le prochain CFP.

Le chapitre 2 passe en revue la littérature existante. Nous avons recensé plus de 1 000 articles qui étudient l'efficacité, la convergence, les inégalités, la gouvernance et bien d'autres sujets sous différents angles. Bien que de nombreux articles s'intéressent à l'efficacité et aux questions qui y sont liées, nous n'avons trouvé que peu d'articles qui examinent les spécificités des programmes et des projets qui ont bien fonctionné. Cela laisse penser que notre travail est novateur. Les principaux éléments que nous avons pu tirer de cet état de l'art sont les suivantes:

- La littérature sur la politique de cohésion est abondante, mais peu concluante: certains articles trouvent des effets positifs à long terme, d'autres repèrent des effets positifs mais seulement à court terme, tandis que d'autres encore ne détectent pas d'effets, voire trouvent des effets négatifs.

- D'importantes sources de complication sont à l'origine de cette disparité de résultats: la complexité des environnements locaux, la diversité des actions politiques parallèles à la politique de cohésion, la multitude des calendriers, les effets d'entraînement entre régions et le manque de données susceptibles d'être analysées, en partie parce qu'il est impossible de mesurer certains facteurs qui jouent un rôle important dans les résultats obtenus par la politique de cohésion.
- Divers obstacles économétriques entraînant des biais d'estimation rendent l'analyse encore plus délicate.
- Très peu d'études se sont penchées sur les caractéristiques des programmes et des projets ayant atteint leurs objectifs.
- Les premières publications sur le cadre de performance de l'Union européenne mettent en avant divers risques et inconvénients.

Le chapitre 3 présente notre propre analyse empirique. Comme l'état de l'art ci-dessus le montre, les méthodes existantes présentent de graves défauts. Nous avons donc préféré adopter une approche inédite plutôt qu'une méthode classique. En étudiant environ 25 caractéristiques des projets, nous avons obtenu un large éventail de résultats intéressants. Nos conclusions essentielles sont les suivantes:

- Les problèmes économétriques inhérents aux méthodes courantes dans la littérature existante nous ont poussé à innover méthodologiquement. Tout d'abord, nous avons cherché à estimer la «croissance économique inexpliquée», en tenant compte de l'influence de différents facteurs propres à chaque région; cette grandeur a ensuite été mise en regard d'environ 25 caractéristiques propres aux projets.
- Parmi les fonds européens (FEDER, Feader, FSE et FC), seul le Fonds de cohésion est positivement corrélé à une croissance économique inexpliquée. L'importance relative des projets interrégionaux, prévus par le FEDER, dans une région présente également une corrélation positive significative avec la croissance économique inexpliquée.
- Une croissance économique inexpliquée forte est souvent associée à un taux de cofinancement national bas et à une proportion importante d'ONG non liées à la recherche et d'entreprises privées parmi les bénéficiaires des programmes (par opposition aux bénéficiaires appartenant au secteur public).
- Dans les régions les plus performantes, les projets durent plus longtemps et les budgets se concentrent sur un nombre plus restreint de priorités. Ces résultats suggèrent que les programmes et les projets stratégiques et ciblés présentent des avantages.
- Les régions les plus performantes participent à davantage de projets interrégionaux.
- Les pays où se situent les régions les plus performantes d'Europe gèrent plus fréquemment les projets à l'échelle nationale.
- La contribution des différents secteurs à la croissance économique inexpliquée reste incertaine, ce qui laisse penser que le succès des investissements sectoriels dépend fortement des caractéristiques régionales.

Le chapitre 4 synthétise nos entretiens avec des acteurs de la politique de cohésion au sein de la Commission européenne, de ministères nationaux et de municipalités ainsi que des experts indépendants. Ces entretiens éclairent différents aspects impossibles à analyser au moyen de données chiffrées – que ce soit parce que celles-ci ne sont pas disponibles ou parce qu'il s'agit d'aspects qualitatifs – de la conception, de la mise en œuvre et de l'efficacité de la politique de cohésion, ainsi que des réformes souhaitables en la matière. Les entretiens ont fait émerger plusieurs points de convergence entre ces acteurs, mais également un certain nombre de divergences. Les principaux enseignements que l'on peut en tirer sont les suivants:

- Il est généralement considéré que la politique de cohésion est la politique européenne la mieux évaluée et qu'elle apporte une valeur ajoutée européenne.
- Dans certains pays, les acteurs locaux n'adoptent pas la même attitude à l'égard des fonds de cohésion que vis-à-vis des fonds nationaux, avec une gestion parfois plus négligente des fonds européens.
- Le cadre de performance rajoute une couche de lourdeur administrative, sans qu'il y ait de corrélation claire avec les résultats et la qualité des actions entreprises.
- En dehors du rôle fondamental de la capacité administrative et de la qualité des institutions, aucune caractéristique précise ne ressort comme facteur de réussite des programmes de cohésion.
- Nos interlocuteurs ont suggéré diverses manières d'améliorer la politique de cohésion en vue du CFP 2021-2027, notamment une meilleure focalisation sur la résolution des problèmes sous-jacents, davantage de planification stratégique et de simplification, des contrôles plus stricts lorsque le risque de corruption est élevé, des synergies avec les autres programmes nationaux et européens, un élargissement de la dimension interrégionale et transfrontalière des projets et un recentrement sur un nombre plus restreint d'objectifs européens dans les régions plus développées.

Le chapitre 5 tire les conclusions de notre état de l'art, de notre analyse empirique et de nos entretiens et dégage des pistes de réforme de la politique de cohésion. Les points essentiels sont les suivants:

- L'affectation globale des ressources de l'Union à la politique de cohésion et aux autres priorités constitue une question politique; nous ne formulerons donc pas de recommandation, tout en constatant que les progrès en matière de convergence réduisent les besoins de fonds de cohésion.
- Au sein de l'enveloppe allouée à la cohésion, les seuls effets positifs sur la croissance que nous avons trouvés sont ceux du Fonds de cohésion. La proposition de réduction substantielle de ce Fonds devrait par conséquent être évaluée seulement après avoir clairement défini l'importance de la convergence économique et des autres objectifs, tels que l'insertion sociale et la protection de l'environnement.
- Le taux de cofinancement national devrait être fixé sur la base des contraintes fiscales, du principe d'additionalité et du risque de corruption. D'après nos calculs, bien que l'augmentation proposée du cofinancement national puisse stimuler l'adhésion aux actions menées, elle pourrait aussi entraîner un ralentissement de la croissance. Nous saluons

l'initiative InvestEU, grâce à laquelle un même projet peut recevoir des subventions ainsi que des financements provenant d'instruments financiers et de fonds publics et privés, ce qui remédierait aux contraintes de financement.

- Notre étude a trouvé une corrélation négative entre la croissance économique et le taux de projets qui sont gérés par des collectivités locales. Une manière d'impliquer davantage les collectivités locales malgré cette tendance serait de soumettre les projets à l'échelle locale, là où les carences et les besoins locaux sont connus avec le plus de précision, tandis que les fonds seraient alloués, supervisés et gérés à plus grande échelle.
- La concentration thématique et la réduction du nombre d'objectifs européens ne sont pas aussi justifiées dans les régions moins avancées que dans les régions plus développées. Quel que soit le degré de concentration thématique, chaque projet devrait être plus ciblé et durer plus longtemps, dans un esprit de planification stratégique à long terme. Une telle approche ne requiert pas de grande flexibilité de la politique de cohésion.
- Il faudrait éviter de renforcer le lien avec le Semestre européen.
- Les projets interrégionaux devraient être encouragés plus vivement.
- Les principaux objectifs de la réforme devraient se concentrer sur les résultats, la simplification et une meilleure transparence des données et des indicateurs relatifs à la conception et à la mise en œuvre des projets.

L'annexe 1 présente un résumé de certains articles tirés de la littérature existante. L'annexe 2 rend compte en détails de notre analyse économétrique complète. L'annexe 3 compare nos conclusions pour les régions NUTS-2 et NUTS-3 à partir d'une base de données interrégionale. L'annexe 4 examine la robustesse de l'analyse si l'on en exclut les régions plus développées. L'annexe 5 détaille les sources de nos données et les ajustements de données que nous avons effectués.

ZUSAMMENFASSUNG

Hintergrund

Die Kohäsionspolitik, das wichtigste Instrument der Europäischen Union zur Förderung der wirtschaftlichen Konvergenz, soll reformiert werden. Die Europäische Kommission hat im nächsten mehrjährigen Finanzrahmen (MFR) der EU für den Siebenjahreszeitraum von 2021 bis 2027 einen überarbeiteten Rahmen für die Kohäsions- (und Regional) politik vorgeschlagen. Der Vorschlag ist Gegenstand intensiver Diskussionen. Diese Studie beruht auf einer Literaturauswertung, empirischer Forschung und der Befragung verschiedener Interessengruppen, und sie soll einen Beitrag zu dieser Debatte leisten.

Ergebnisse

Zunächst werden in dieser Studie folgende Punkte hervorgehoben:

- Ein Ziel der Europäischen Union besteht gemäß den Verträgen darin, die Unterschiede im Entwicklungsstand der verschiedenen Regionen und den Rückstand der am stärksten benachteiligten Gebiete zu verringern.
- Es gibt mehrere Gründe für die Kohäsionspolitik: soziale Gründe (Förderung der Gleichstellung), politische Gründe (Einhaltung der Erweiterungsabkommen) und wirtschaftliche Gründe (Schaffung von Bedingungen, die es den vom Binnenmarkt benachteiligten Regionen ermöglichen zu prosperieren). Mit ihr werden außerdem die Prioritäten der EU für eine inklusive, intelligente, grüne und nachhaltige Entwicklung unterstützt.
- In der Fachliteratur gibt es keine einhellige Meinung über die Wirkung der Kohäsionspolitik, was zum Teil auf erhebliche methodische und datentechnische Schwierigkeiten zurückzuführen ist.
- Diese Studie verwendet eine neuartige Methodik, bei der die Merkmale von Projekten der Kohäsionspolitik in den am besten und den am schlechtesten abschneidenden Regionen der EU-Länder gegenüberstellt werden.
- Diese Studie stellt keine formelle Bewertung oder Prüfung der Kohäsionspolitik dar. Ihr Zweck ist es vielmehr, die Mitglieder des Europäischen Parlaments bei der Bewertung der Umsetzung des derzeitigen MFR und bei der Prüfung der nächsten Generation von Programmen für den kommenden MFR zu beraten.

In Kapitel 2 wird die vorhandene Literatur zu dem Themenbereich ausgewertet. Dabei sind wir auf über 1 000 Artikel gestoßen, die sich mit verschiedenen Aspekten der Effektivität, Konvergenz, Ungleichheit, Verwaltung und vielen anderen Themen befassen. Während sich viele Publikationen mit der Effektivität und verwandten Themen befassen, haben wir nur wenige Artikel gefunden, in denen die Merkmale erfolgreicher Programme und Vorhaben bewertet wurden, was darauf hindeutet, dass wir mit unserer Studie Neuland betreten. Unsere wichtigsten Schlussfolgerungen aus der Literaturauswertung sind die folgenden:

- Es gibt eine breite Palette von Literatur zur Kohäsionspolitik, die jedoch kein schlüssiges Bild liefert. In einigen Artikeln werden positive langfristige Effekte festgestellt, in anderen nur

positive kurzfristige Effekte, während anderswo überhaupt keine oder sogar negative Effekte festgestellt werden.

- Die unterschiedlichen Ergebnisse sind auf gewichtige erschwerende Faktoren zurückzuführen, die mit komplexen lokalen Rahmenbedingungen, der Vielfalt der politischen Interventionen, die über die Kohäsionspolitik hinausreichen, unterschiedlichen Zeitrahmen, Ausstrahlungseffekten auf andere Regionen und fehlenden geeigneten Daten für die Analyse zusammenhängen, zum Teil weil bestimmte wichtige Faktoren, die das Ergebnis der Kohäsionspolitik beeinflussen, nicht messbar sind.
- Verschiedene ökonometrische Probleme und damit verbundene Verzerrungen bei den Schätzungen erschweren die Analyse zusätzlich.
- Die Merkmale erfolgreicher Programme und Projekte wurden nur in sehr wenigen Studien analysiert.
- In der frühen Literatur über den Leistungsrahmen der EU wird auf verschiedene Risiken und Nachteile hingewiesen.

In Kapitel 3 wird unsere empirische Analyse vorgestellt. Wie unsere Literaturübersicht zeigt, gibt es große Probleme bei den bestehenden Methoden. Deshalb haben wir einen neuen Ansatz anstelle einer Standardmethode gewählt. Wir haben rund zwei Dutzend Projektmerkmale untersucht, die zu einer Vielzahl von interessanten Ergebnissen führen. Unsere wichtigsten Erkenntnisse daraus sind die folgenden:

- Aufgrund ökonometrischer Probleme mit den in der Literatur verwendeten Standardmethoden haben wir uns für eine neue Methodik entschieden, bei der zunächst das „unerklärte Wirtschaftswachstum“ veranschlagt wird, indem der Einfluss verschiedener regionalspezifischer Faktoren berücksichtigt sowie analysiert wird, in welcher Beziehung es zu etwa zwei Dutzend projektspezifischen Merkmalen steht.
- Von den EU-Fonds (EFRE, ELER, ESF und Kohäsionsfonds) wird nur letzterer positiv mit unerklärtem Wirtschaftswachstum in Verbindung gebracht. Die relative Bedeutung überregionaler Projekte (Teil des EFRE) in einer Region wird auch vielfach mit einem höheren unerklärten Wirtschaftswachstum in Verbindung gebracht.
- Niedrigere nationale Kofinanzierungssätze korrelieren mit einem höheren unerklärten Wirtschaftswachstum, ebenso wie höhere Anteile von nichtstaatlichen Organisationen, die nicht zum Forschungsbereich gehören, und von privaten Einrichtungen unter den Begünstigten (im Gegensatz zu Begünstigten aus dem öffentlichen Sektor).
- In den leistungsstärksten Regionen findet man Projekte mit längerer Laufzeit, und die Budgets der Programme sind dort stärker auf einige wenige Prioritäten konzentriert. Diese Ergebnisse deuten darauf hin, dass strategische und zielgerichtete Programme und Projekte vorteilhaft sind.
- In den leistungsstärksten Regionen gibt es mehr überregionale Projekte.
- Die nationale Verwaltung von Projekten ist in Ländern mit den leistungsstärksten Regionen Europas häufiger anzufinden.
- Die Rolle unterschiedlicher Wirtschaftszweige beim unerklärten Wirtschaftswachstum ist nicht eindeutig, was darauf hindeutet, dass der Erfolg sektoraler Investitionen stark von regionalen Besonderheiten abhängt.

In Kapitel 4 werden unsere Interviews mit relevanten Interessengruppen aus den Reihen der Europäischen Kommission, der nationalen Ministerien, Kommunen und unabhängigen Sachverständigen zusammengefasst. Diese Interviews beleuchten verschiedene Aspekte der Gestaltung, Umsetzung, Wirksamkeit und wünschenswerter Reformen der Kohäsionspolitik, die wir mit Hilfe von Daten nicht analysieren können, weil die Daten entweder nicht verfügbar sind oder nicht über die notwendige Qualität verfügen. Eine Reihe gleichlautender Beobachtungen wurde von mehreren Befragten gemacht, aber es gab auch mehrere Aspekte, bei denen die Befragten unterschiedlicher Meinung waren. Die wichtigsten Erkenntnisse aus den Interviews waren die folgenden:

- Nach Ansicht der Befragten ist die Kohäsionspolitik die am meisten geschätzte EU-Politik überhaupt, und sie dient der Schaffung eines europäischen Mehrwerts.
- In einigen Ländern haben die lokalen Akteure eine andere Einstellung zu den Kohäsionsfonds und den nationalen Fonds, was zuweilen zu einem weniger sorgfältigen Umgang mit EU-Mitteln führt.
- Es wird festgestellt, dass der Leistungsrahmen einen zusätzlichen Verwaltungsaufwand mit sich bringt, ohne dass es einen klaren Zusammenhang zu den Ergebnissen und der Qualität der Maßnahmen gibt.
- Abgesehen von der entscheidenden Rolle der Verwaltungskapazität und der Qualität der jeweiligen Institutionen gibt es keine eindeutigen Merkmale, die zum Erfolg der Kohäsionsprogramme beitragen.
- Die Befragten unterbreiteten verschiedene Vorschläge zur Verbesserung der Kohäsionspolitik im MFR 2021-2027, darunter eine stärkere Hinwendung zur Lösung der zugrundeliegenden Probleme, eine stärker strategische Planung, eine Vereinfachung, eine strengere Kontrolle in Falle eines hohen Korruptionsrisikos, Synergien mit anderen EU-Programmen und nationalen Programmen sowie mehr überregionale, grenzüberschreitende Projekte und eine stärkere Konzentration auf weniger europäische Ziele in den stärker entwickelten Regionen.

Im abschließendem Kapitel 5 wird dargelegt, welche Konsequenzen sich aus unserer Literaturauswertung, empirischen Analyse und Befragung für eine Reform der Kohäsionspolitik ergeben. Die wesentlichen Punkte sind folgende:

- Die allgemeine Zuweisung von EU-Mitteln für die Kohäsionspolitik und andere Prioritäten ist eine politische Frage, und deshalb geben wir keine Empfehlung ab, wenngleich wir feststellen, dass der Bedarf an Kohäsionsfonds mit einer stetig zunehmenden Konvergenz abnimmt.
- Bei der Mittelausstattung für das Ziel der Kohäsion haben wir nur für den Kohäsionsfonds wachstumsfördernde Effekte feststellen können. Die vorgeschlagene drastische Kürzung dieses Fonds sollte daher auf der Grundlage einer Klarstellung der Bedeutung der wirtschaftlichen Konvergenz und anderer Ziele wie der sozialen Inklusion und des Umweltschutzes bewertet werden.
- Der nationale Kofinanzierungsanteil sollte in Anbetracht der haushaltspolitischen Lage, des Zusätzlichkeitsprinzips und des Korruptionsrisikos festgesetzt werden. Wir begrüßen die Initiative InvestEU, mit der für ein einzelnes Projekt Mittel aus Finanzinstrumenten, Zuschüssen

sowie privaten und öffentlichen Mitteln beschafft und dadurch Finanzierungsengpässe ausgeglichen werden können.

- In unserer Studie wird auf eine negative Korrelation zwischen dem Wirtschaftswachstum und dem Anteil der von lokalen Stellen verwalteten Projekte hingewiesen. Eine Möglichkeit, dieses Manko zu beheben und gleichzeitig für eine stärkere Beteiligung der lokalen Stellen zu sorgen, wäre die Kopplung der lokalen Nachfrage nach Projekten, die auf einer genaueren Kenntnis der lokalen Bedürfnisse und Defizite beruht, mit einer Zuweisung, Aufsicht und Verwaltung auf höherer Ebene.
- Eine thematische Konzentration bei gleichzeitiger Straffung der EU-Ziele ist in den stärker entwickelten Regionen durchaus gerechtfertigt, nicht jedoch in den weniger entwickelten Regionen. Unabhängig vom Grad der thematischen Konzentration sollten einzelne Projekte im Einklang mit einer langfristigen strategischen Planung stärker fokussiert sein und eine längere Laufzeit haben. Bei einem solchen Ansatz ist keine besonders hohe Flexibilität der Kohäsionspolitik vonnöten.
- Eine stärkere Verknüpfung mit dem Europäischen Semester sollte vermieden werden.
- Überregionale Projekte sollten weiter gefördert werden.
- Die Konzentration auf die Ergebnisse und eine Vereinfachung sollten neben einer größeren Transparenz der Daten und Indikatoren für die Gestaltung und Durchführung von Projekten Hauptziele der Reform sein.

Anhang 1 enthält eine Zusammenfassung ausgewählter Artikel aus der Literatur, Anhang 2 enthält ausführliche Angaben über unsere vollständige ökonometrische Analyse, in Anhang 3 werden unsere Ergebnisse für NUTS-2- und NUTS-3-Regionen unter Verwendung eines überregionalen Datensatzes verglichen, in Anhang 4 wird die Belastbarkeit der Aussagen durch Ausschluss weiter entwickelter Regionen aus der Analyse geprüft, und Anhang 5 enthält Angaben über unsere Datenquellen und Datenanpassungen.

1. INTRODUCTION

KEY FINDINGS

- A treaty-based objective of the European Union is to reduce disparities between the levels of development of various regions, and the backwardness of the least-favoured regions.
- Cohesion policy has various social (fostering equality), political (honouring enlargement agreements) and economic (creating conditions that allow regions adversely affected by the single market to prosper) rationales. It also supports the EU's inclusive, smart, green and sustainable development priorities.
- In the literature, there is no conclusion on the impact of cohesion policy, partly because of major methodological and data complications.
- This study uses a novel methodology that contrasts the characteristics of cohesion projects in the best and worst-performing regions of EU countries.
- This study is not a formal evaluation or audit of cohesion policy. Its goal is to advise Members of the European Parliament when assessing the implementation of the current MFF and considering the next generation of programmes for the next MFF.

A key objective of the European Union is to strengthen regional cohesion by addressing development disparities, particularly by targeting less-favoured regions[1]. There are various social, political and economic rationales for an EU-wide cohesion (or regional) policy. Equality is an important social concept; a socially more cohesive union can also be politically more cohesive. Of similar importance, the EU's southern and eastern enlargements could be seen as a political bargain in which the newer, less-developed member states opened up their markets for companies established in older, more-developed member states for goods, services and investment. In return, the earlier members accepted labour migration from these least-developed countries and directed financial transfers to the newer member states in the form of cohesion policy, to support their transformation and convergence.

The economic rationale behind cohesion policy relates to market integration. Market integration is set to generate agglomeration effects because economic activities concentrate in technologically advanced regions that also attract people. This implies that certain regions will suffer from market integration. Cohesion payments should not be regarded as compensation for losers, but as a tool to create the conditions for increased returns to investment through the provision of collective goods including infrastructure, information technology and research and development, thus helping adversely affected regions to prosper and retain (or even attract) people.

Cohesion policy is also a tool to foster the achievement of EU priorities, such as inclusive, smart, green and sustainable development.

The EU spends about 34% of its budget on cohesion policy objectives, with commitment appropriations of EUR 367 billion for the 2014-2020 Multiannual Financial Framework (MFF). The

[1] Art. 174 of the Treaty on the Functioning of the European Union: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12008E174.

European Commission's May 2018 proposal for the next 2021-2027 MFF would allocate 30% of the total budget to cohesion. The 2014-2020 cohesion funds are split between the European Regional Development Fund (ERDF, 55%), the European Social Fund (ESF, 23%), the Cohesion Fund (CF, 20%) and the Youth Employment initiative (1%). These funds co-finance economic development programmes drawn up by different regions. Programmes must demonstrate how they contribute to progress towards a broad range of objectives, from research and development activities in small and medium-sized enterprises, to public administration and social inclusion. The European Agricultural Fund for Rural Development (EAFRD) is considered part of the Common Agricultural Policy (CAP), but since the EAFRD has a regional focus, we also consider this fund in our study. The 2014-2020 MFF allocated EUR 96 billion to the EAFRD. EAFRD is also part of the European Structural and Investment Funds (ESIF), along with the ERDF, ESF, CF and the European Maritime and Fisheries Fund (EMFF)[2].

Of the ERDF and ESF amounts, 67% is allocated to regions where the GDP per capita is below 75% of the European average ('less developed regions'); 13% goes to regions with GDP per capita between 75 and 90% of the European average ('transition regions'); and the remaining 20% is for more-developed regions. The issue of whether more-developed regions should continue to receive cohesion funding is a subject of debate, yet so far, there has been no political consensus in favour of removing this type of funding. The Cohesion Fund is allocated to countries with gross national income (GNI) per capita below 90% of the EU average.

In the literature, there is no conclusion on the impact of cohesion policy (Darvas and Wolff, 2018). Macroeconomic simulations conclude that these funds have a positive effect, but such results are the reflection of the assumptions made. The results of empirical analyses have been mixed and inconclusive, suggesting that cohesion funds have the potential to generate significant growth, but do not always fulfil this potential.

The delivery of cohesion policy has become tremendously complex over the years. The European Commission therefore introduced a number of measures to simplify the delivery of cohesion policy for the 2014-2020 programming period. These included the harmonisation of rules, common indicators and mandatory use of Simplified Cost Options (SCOs) for ESF projects with up to EUR 50,000 of public support[3]. Optional measures included the merger of managing and certifying authorities and greater scope for using SCOs[4]. The Commission's May 2018 proposal for the next 2021-2027 MFF plans further major simplification measures, such as a significant shortening of the rulebook, the elimination of certain procedures such as *ex-ante* assessments, elimination of annual implementation and progress reports for cohesion policy, more widespread use of SCOs and the method of financing not related to costs, and common concepts for output and results indicators across cohesion policy.

While simplification should be a major goal of the reform, as also shown by our survey of stakeholders, the European Court of Auditors (ECA, 2018, 2019) found that there was no consensus on the objectives

[2] Information about ESIF: https://ec.europa.eu/info/funding-tenders/funding-opportunities/funding-programmes/overview-funding-programmes/european-structural-and-investment-funds_en
[3] Article 14(4) of Regulation (EU) 1304/2013, (OJ L 347, 20.12.2013, pp. 470–486.
[4] Part two, Article 67-68 of Regulation (EU) 1303/2013, of 17 December 2013, (OJ L 347, 20.12.2013, pp. 320–469) and Article 14 of Regulation (EU) 1304/2013, (OJ L 347, 20.12.2013, pp. 470–486).

of simplification, i.e. on why, to whom and how to simplify. Effective coordination and, in turn, more efficient and targeted use of cohesion policy will require an evidence-based and structured approach to the evaluation of Operational Programmes (OPs). Indeed, this is one of the ECA's four guiding principles for effective cohesion policy, post-2020. A better understanding of the specific characteristics of programmes that produce positive results is, therefore, crucial to achieving this more structured and streamlined approach to cohesion policy in the future.

The main purpose of this study is to identify the characteristics of cohesion policy projects that contribute to successful outcomes. To this end, our methodology is composed of four main elements.

First, we survey the literature on the effectiveness of cohesion policy to determine potential success factors, and to identify how success has been measured. We highlight the difficulties in measuring the impact of cohesion policy, which leads us to choose a new methodology. While thousands of works have assessed various aspects of cohesion policy, the literature analysing programme or project characteristics is scarce. We also survey the literature on the Performance Framework (PF)[5], highlighting drawbacks and risks of the PF.

Second, we use a quantitative econometric model to identify the EU NUTS-2 regions[6] that have performed the best and the worst in terms of GDP growth per capita at a regional level, relative to other similar regions, by controlling for various initial conditions. Clearly, GDP growth is not the only goal of cohesion policy. Several programmes aim to preserve the environment, foster urban development or promote social inclusion. Such programmes might not lead to an immediate uptick in economic growth. However, most cohesion funding is spent on less-developed regions. Economic convergence remains the most important objective of cohesion policy.

Because of the difficulties in identifying the causal impact of cohesion policy, our econometric model is not designed to measure the impact of cohesion policy *per se*, but to sort regions according to their growth performance. Good growth performance might, or might not, be related to cohesion policy and there could also be several indirect channels. For example, cohesion policy can improve infrastructure, which, in combination with state aid from the government of the country, attracts foreign direct investment, ultimately leading to faster growth, higher employment and increases in GDP per capita.

Third, once these best and worst performing regions are identified, we systematically analyse the characteristics of projects carried out in each of them, using publicly available data collected and provided by the European Commission through the Open Data Portal[7] and the keep.eu interregional

[5] The Performance Framework is programme-specific, agreed between the Commission and the relevant national/regional decision-makers in charge of spending the money. See Article 21 and Annex II in https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1303&from=EN.

[6] The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU. It has three levels: NUTS-1: major socio-economic regions; NUTS-2: basic regions for the application of regional policies; NUTS-3: small regions for specific diagnoses. Regions eligible for support from cohesion policy have been defined at NUTS-2 level. There are occasional changes to this classification. The current classification lists 104 regions at NUTS-1, 281 regions at NUTS-2 and 1348 regions at NUTS-3 level. See: https://ec.europa.eu/eurostat/web/nuts/background.

[7] See: https://cohesiondata.ec.europa.eu/projects.

dataset[8]. The interaction of cohesion policy with other EU and national policies, and with various other factors, makes it practically impossible to draw causal conclusions. However, one can still draw insights by comparing the characteristics of projects in the best and worst performing regions, in order to highlight aspects that differentiate them from each other. We consider around two-dozen project characteristics, which include financial, managerial and operational aspects of the projects as well as the sector of intervention and whether private-sector involvement is influential. The rate of national co-financing might play a role, as might whether the priorities of the programmes under which the projects are implemented are concentrated or dispersed.

Fourth, we complement our findings with interviews with relevant stakeholders about the ingredients that make successful and effective cohesion policy programmes and projects. We also asked the opinion of interviewees about how cohesion policy should be reformed and, in particular, whether the proposals put forward by the European Commission in the context of the next 2021-2027 MFF have the potential to improve the effectiveness of the policy. Our interviewees included officials from DG REGIO, national and regional ministries in charge of coordinating cohesion policy locally, and independent experts in cohesion policy.

This study should not be confused with a formal evaluation or audit of cohesion policy, as neither the scope of the study nor the access to information would be sufficient. The goal of this study is to advise Members of the European Parliament when assessing the implementation of the current MFF and considering the next generation of programmes for the next MFF.

[8] See: https://www.keep.eu/.

2. LITERATURE REVIEW

KEY FINDINGS

- There is extensive literature available on cohesion policy, which is inconclusive: some works find positive long-term impacts, others positive but only short-term impacts, while others find no impact at all or even negative impacts.
- The variety of results is due to major complicating factors, related to complex local environments, the diversity of policy interventions beyond cohesion policy, varying time frames, cross-regional spill-over effects and lack of appropriate data for the analysis, partly because certain important factors, which influence the outcome of cohesion policy, are not measurable.
- Various econometric problems and related estimation biases complicate the analysis further.
- Very few studies analysed the characteristics of successful programmes and projects.
- The early literature on the EU's Performance Framework highlights various risks and drawbacks.

THE IMPACT OF COHESION POLICY

There is extensive literature available on cohesion policy. We have identified more than 1,000 papers dealing with various aspects of effectiveness, convergence, inequality, governance and many others. While a large number of papers deal with effectiveness and related issues, we have found very few papers that assess the characteristics of successful programmes and projects, suggesting that our own work is novel.

Previous literature surveys include Hagen and Hohl (2009), Marzinotto (2012), Pienkowski and Berkowitz (2015) and Crescenzi and Giua (2017).

Hagen and Hohl (2009) found that the overall empirical evidence points to minor convergence between most European regions, but whether or not this potential success results from EU cohesion policy remains an open question. They argued that the existing empirical evidence has provided mixed, if not contradictory, results. While some authors do find evidence of a positive impact from structural funds on economic growth, others find little or no impact. Studies using country-level data found that cohesion policy seems to be only conditionally effective. Given a good quality institutional setup or decentralised governmental structures, cohesion policy has a positive impact on growth. However, these studies highlight that the use of regional level data would be preferable – and we use this kind of data in our paper.

Hagen and Hohl (2009) highlighted some important limitations of econometric studies. They listed four reasons why empirical regression estimates, which aim to measure the impact of cohesion policy on economic growth, suffer from the so-called simultaneity bias. This bias occurs when one or more explanatory variables (for example, cohesion spending and investments) are endogenously determined with the explained variable (for example, economic growth) and the endogeneity is not

properly dealt with[9]. A further econometric problem is that it is not clear which model to use and which functional form is appropriate. Since cohesion policy could impact outcomes with a time-lag, the specification of dynamic impacts creates further complications.

Similar conclusions were drawn by the comprehensive literature survey of Marzinotto (2012). She concluded that impact assessments of regional fund spending depend on the methodology used. While macroeconomic model simulations conclude that such funds have a positive impact (which reflects the assumptions made for the models), the results of empirical studies are more mixed. Marzinotto (2012) concluded that by and large, the available literature finds investments in infrastructure and education to be the most growth-enhancing investments, but studies reaching such conclusions typically abstract from the actual allocation of EU funds across themes of intervention and sectors. More direct empirical tests sometimes find a positive, even if often small, impact of EU funds on growth convergence. In particular, investment in human capital and R&D generates positive long-term effects on growth convergence, while other spending, such as infrastructure, might deliver only a short-term effect. Yet there is no consensus in the literature, and other studies do not find that the rate of convergence has been higher in funded regions than in non-EU-funded regions.

Pienkowski and Berkowitz (2015) also concluded that most studies find a positive but small impact of EU structural funds on regional growth, especially in less-developed regions. Some studies show varied results for different countries and regions. Moreover, some studies found no significant impact on regional growth, or even a negative impact. Pienkowski and Berkowitz (2015) attributed differences in results to different methodologies, variables and datasets used in the regressions, but also to different time periods covered by the analyses.

Crescenzi and Giua (2017) first underlined the difficulties in measuring the impact of cohesion policy. It works in very heterogeneous local economic and social contexts. It operates in an environment subject to a multiplicity of measures and multiplicity of national, regional and local rules and systems. An additional difficulty is the separation of the impact of EU spending from national spending, which is a particularly difficult issue since EU spending is much smaller than national spending on average, though public investment in some less-developed countries is primarily financed by the EU. Projects have varying time frames, and several projects are ongoing at the same time, which is another factor making it more difficult to identify the impacts. Spillovers across regions add further complications. For example, EU spending in transition regions can have positive impacts on less-developed regions. Data problems, including lack of significant data and the varying definitions of the available indicators, present additional major challenges. For example, various institutional and structural regional factors (including degree of decentralisation, the presence of national supportive institutions, trust, openness, lack of corrupt practices, geographical position and initial conditions), political economic factors

[9] They suggested four reasons why this could be the case: (1) reverse causality, since the EU's cohesion policy conditionality is likely to be linked to the growth rate of the region that benefits from the cohesion funding; (2) there can be unobserved or omitted variables such as a spill-over effect where a neighbouring region can be affected by cohesion policy funding; (3) Nickell bias, which occurs when a fixed-effects econometric model is applied to a dynamic setup; (4) measurement errors, because while cohesion funding data is available at regional level, many observed variables are only available at national level or are not available at all.

(including whether the country is federal or decentralised, the political situation within the country and the region, and relationships between various layers of governance), as well as the interaction between cohesion policy and other (EU and national) policies, influence the impact of cohesion policy. For many of these factors, proper variables are not available, partly because they are not observable or measurable. Excluding important variables from an empirical analysis leads to the so-called omitted variable bias, which – in simple terms – means that the impacts of omitted variables are attributed to the included variables, and thereby the parameter estimates of the included variables are biased. Some works try to establish a hypothetical counterfactual scenario: how would the region have developed without EU cohesion money? Comparison of actual outcomes with the counterfactual scenario could indicate the impact of cohesion policy, but it is extremely difficult to establish a reasonable counterfactual scenario. Crescenzi and Giua (2017) ultimately concluded that cohesion policy has a positive and significant influence on economic growth in all European regions, whereby the impacts are stronger in the most socio-economically advanced areas and when cohesion policy is complemented by rural development and Common Agricultural Policy (CAP) funds. However, because of the large number of complicating factors they listed, any such result should be read with caution.

Beyond these overview survey papers, we have also examined some selected works (Table 12 in Annex 1). The table further highlights the inconclusiveness of the empirical evidence. Some works find convergence, others no effect, while the results of some papers are conditional on good governance, geographical characteristics, initial endowments of the region, or the economic structure of regions. In our own econometric calculations, we included such control variables. The variety of results likely originates from the econometric difficulties we highlighted above, which is why we decided to use a novel and different methodology in the empirical section of this report.

CHARACTERISTICS OF SUCCESSFUL PROGRAMMES

Very few studies have analysed the characteristics of programmes to identify which particular programme designs deliver better convergence results. In fact, because of all the complicating factors we listed in the previous section, the identification of characteristics also faces major challenges.

A particularly useful work in this regard is Bachtler *et al* (2013), which is summarised by Bachtler *et al* (2017). The underlying work assessed 15 selected regions from ten EU countries from 1989 to 2012. The research did not aim to establish a causal link between cohesion policy and economic growth, but aimed to answer the questions: (1) whether the programmes implemented by the regions achieved what they were designed to do; and (2) whether what they achieved dealt with the needs of the regions (as identified at the start of the process). The methodology for analysing these 15 cases studies included a mix of desk research, interviews with stakeholders and consultative workshops, and also drew on case studies prepared by teams of three experts on average working on each of the 15 regions.

The main conclusion of this research was that cohesion policy suffered from a lack of conceptual thinking and strategic justification for programmes. Objectives were neither specific nor measurable. There were various deficiencies in most areas of management. Bachtler *et al* (2013) argued that there have been some improvements in these areas, but progress in addressing these problems has been

slow and inconsistent, and some regions experienced a deterioration of implementation quality over the 2007-2013 period.

The study supported the key principles of the 2013 reforms of cohesion policy, including greater concentration of resources, strategic coherence, integrated investment and the role of administrative capacity as a precondition for effective implementation.

The study also highlighted some programme characteristics that were associated with greater success. On expenditure categories, Bachtler *et al* (2013) reported a generally positive view of the effectiveness of the objectives related to different forms of infrastructure. Business parks had mixed results, while structural adjustment activities and industrial modernisation investments were problematic. Several tourism programmes were considered effective, while innovation measures had short-term effects, with expectations of more significant effects later. Greater effectiveness was achieved when innovation measures put a greater emphasis on support for the private sector through knowledge exchange and a more sophisticated innovation system. Systemic approaches to support entrepreneurship were also found to have positive effects. Environmental measures, and social, community and territorial development actions, had mixed results. Bachtler *et al* (2013) also concluded that those objectives that relied on public-sector intervention appeared to have been more readily achieved. Short-term effectiveness appeared to be greater for large-scale physical infrastructure, environmental improvements, and local business and innovation infrastructure programmes. Results were mixed in terms of achievement of objectives that depended on entrepreneurial activity or funding by the private sector.

THE PERFORMANCE FRAMEWORK

The Performance Framework (PF) was introduced as a tool to improve the performance orientation of the EU budget. Each spending programme under the 2014-2020 MFF contains a PF that defines its goals and relevant indicators and arrangements to help monitoring and reporting to the Commission. This forms the basis for evaluation. The Performance Framework is programme-specific, agreed by the Commission and the relevant national/regional decision-makers in charge of spending the money[10]. Four types of indicators are used: financial indicators, output indicators, result indicators and key implementation steps. Within each programme, projects are selected by the national/regional authorities using national selection criteria; they also monitor projects and manage the project portfolios.

Significant progress was made in the 2014-2020 MFF period in setting more specific objectives for programmes, collecting highly structured data on implementation and performance and the use of open data (https://cohesiondata.ec.europa.eu/). In the context of cohesion policy, PFs are compulsory elements of the European Structural and Investment Funds (ESIF). The aim is that the potential allocation of additional funds, if goals are achieved, would give an incentive to programme managers to promote successful cohesion measures. Box 1 gives four selected examples of PF from different

[10] See Article 21 and Annex II in https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1303&from=EN

countries and sectors. Gramillano *et al* (2018) comprehensively review the indicators and recommendations for the post-2020 period.

The PF is linked to a performance review, which is, at the time of writing, being carried out by DG REGIO of the European Commission. Publication of the results is expected in mid-2019. DG REGIO auditors evaluate whether programmes have achieved their purpose, having in mind the relevant indicators and the milestones. A performance reserve is set at 6% of operational programme funding. The performance reserve shall be allocated only to programmes and priorities that have achieved their milestones. Where milestones have not been achieved, the member state in question shall propose reallocation of the corresponding amount of the performance reserve to priorities set out in the Commission decision, based on the 2019 performance review. The member state's proposal to reallocate the performance reserve shall be consistent with thematic concentration requirements and minimum allocation rules. In case of a serious failure in achieving a priority's milestones relating to the financial and output indicators and key implementation steps set out in the PF, the Commission can suspend all or part of an interim payment to a programme priority.

Since the PF is still at the implementation stage and the performance review has not been published at the time of writing, the literature focuses on the *ex-ante* analysis of this tool, or at best on the early outcomes of its implementation.

The studies by the European Court of Auditors (2017a and 2017b), and the academic studies, provided sound arguments in favour the existence of the PF in the context of cohesion policy: the tools are seen as increasing the focus on the results of the programmes, providing some guidance during the implementation phase, and providing an incentive for identification of more realistic targets than previously.

However, a growing body of literature has highlighted the fact that increased measurement in public policy has its drawbacks, notably because of the difficulty in establishing undistorted indicators, the lack of clarity of chosen goals, and the level of control of public managers over the outcomes. This general economic policy assumption is backed up by McMaster and Kah (2017), which relies on a survey of managers of programmes supported by cohesion funds.

Despite the fact that its implementation is still at an early stage, the Performance Framework has already been criticised twice by the European Court of Auditors (European Court of Auditors (2017a, 2017b), notably for its lack of an effective incentive: in particular the auditors highlighted the fact that member states will benefit from the funding, whether or not programmes meet their targets. Only a serious failure (i.e. if indicators are below 65% of the target value) might lead to suspension of interim payments, but in that case, the funding will be distributed to the other programmes managed by the member state. Another key criticism is based on the fact that indicator maximisation might drive the programmes. Finally, indicators are not responsive to external changes such as the national economic situation, or a policy change at national level. The hypothesis that the PF provides an incentive to perform better is not shared by the programme managers themselves.

One of the main criticisms is that when it comes to cohesion policy within the same priority, the PF has to be implemented separately for each of the funds and each category in a region. It unnecessarily

increases the complexity of the PF at the project level, and therefore complicates assessments. However, when the funding of a project consists of a blend of different funding sources, the outcomes often cannot be disentangled.

In their review of the feedback given by a network of programme managers, McMaster and Kah (2017) pointed out several difficulties encountered by programme managers on the ground, including the lack of relevant data, the associated administrative burden, and the uncertainty over how the performance reserve will be applied. Programme managers pointed out that data gathering is a time and resource consuming process.

As an example of the ongoing implementation of the PF, McMaster and Kah (2017) looked at the operational programme in the region of Pomorskie in Poland. In this particular region, the local government has a recognised lack of experience in indicator setting, and has received little help on this from the Polish government or the European Commission. Therefore, the accuracy of the chosen indicators could be questioned. For the moment, all indicators remain at zero in Pomorskie since the programme is not finished, as is the case in a significant number of regions. The managing authorities are nevertheless confident that the targets will be met. Therefore, in this case, the indicators are *a priori* hardly usable for a quantitative economic analysis of the efficiency of the PF. Furthermore, some regulatory and operational aspects influence the level of performance as measured by the indicators. In the Pomorskie case, regulatory requirements, such as public procurement procedures, delay the implementation. In preparation for the performance review, the Pomorskie operational programme managing authorities aim to ensure the availability of the data to provide to the European Commission.

Overall, while it is difficult to access the PF since its implementation is still at an early stage, *ex-ante* and survey-based analyses in the literature highlight various risks and drawbacks. Our research, which is influenced by interviews and is summarised in Chapter 0 of this report, highlights major problems with the PF and questions its effectiveness.

Box 1: Performance Framework examples

This box presents four selected examples of PF from different countries and sectors.

Example 1: Large Infrastructure Operational Programme, Romania

The Large Infrastructure Operational Programme (LIOP) promotes sustainable economic growth and safe and efficient use of natural resources. It addresses the development challenges identified at national level in terms of transport infrastructure, sustainable urban transport, environment, energy, and risk prevention.

Funding:

Total OP budget: EUR 10.85 billion

Total EU contribution: EUR 9.22 billion, of which CF EUR 6.93 billion and ERDF EUR 2.28 billion

Targeted expected outcomes:

1	Travel time on the road TEN-T core network reduced to 74.1 min/100km
2	Travel time on the rail TEN-T network reduced to 79.2 min/100km
3	The quantity of goods carried by inland waterways will increase to 32.2 tonnes/year
4	The share of metro system in public passenger transport in Bucharest will increase to 23%
5	The number of road fatalities per million inhabitants will decrease to 73/year
6	The number of passengers embarked and disembarked in airport transport will increase to 20 million/year
7	An increase in the containerised cargo volume handled in intermodal terminals to 70,000
8	A cut in half of the waiting time in customs at exit points in agglomerated periods (carriers)
9	The amount of biodegradable waste landfilled will be reduced to 1.53 million tonnes/year
10	The recycling rate of household and similar waste will increase to 50%
11	The level of population covered by public drinking water systems will increase to 99.5%
12	Restore 10% of degraded ecosystems
13	The annual average economic damage caused by adverse hydrological events will decrease to EUR 383.16 million/year
14	The primary production of energy from less exploited renewable sources will increase to 455.96 MWh/year
15	Energy intensity of industry will decrease to 121.5 kgep/EUR 1000
16	Energy losses from heating networks at national level will decrease to 15% in less-developed regions

List of the 17 detailed indicators used in the performance framework:

1	All firms receiving support
2	Energy efficiency: number of additional energy users connected to smart grids
3	Greenhouse gas reductions: estimated annual decrease of GHG
4	Inland waterways: total length of improved or created inland waterway

5	Land rehabilitation: total surface area of rehabilitated land
6	Nature and biodiversity: surface area of habitats supported to attain better conservation status
7	Railway: total length of reconstructed or upgraded railway line
8	Railway: total length of reconstructed or upgraded railway line, of which: TEN-T
9	Renewables: additional capacity of renewable energy production
10	Risk prevention and management: population benefiting from flood protection measures
11	Roads: total length of newly built roads
12	Roads: total length of newly built roads, of which: TEN-T
13	Roads: total length of reconstructed or upgraded roads
14	Solid waste: additional waste recycling capacity
15	Urban transport: total length of new or improved tram and metro lines
16	Wastewater treatment: additional population served by improved wastewater treatment
17	Water supply: Additional population served by improved water supply

Example 2: Operational Programme Environment, Bulgaria

Aim of the programme: to preserve and protect the environment, and to prevent natural risk and mitigate climate change effects in Bulgaria.

Funding:

Total OP budget: EUR 1.77 billion

Total EU contribution: EUR 1.50 billion, of which CF EUR 1.13 billion and ERDF EUR 0.37 billion

Targeted expected outcomes:

1	Additional 1.5 million people served by improved wastewater treatment
2	Additional 200,000 people served by improved water supply
3	285,000 tonnes less waste going to landfills
4	1.3 million people benefitting from cleaner air
5	4.4 million hectares of NATURA 2000 habitats with improved conservation status of species
6	2.8 million people benefitting from flood protection and reduced risk of landslides

List of 5 detailed indicators used in the performance framework:

1	Risk prevention and management: population benefitting from flood protection measures
2	Wastewater treatment: additional population served by improved wastewater treatment
3	Water supply: additional population served by improved water supply
4	Solid waste: additional waste recycling capacity
5	Nature and biodiversity: surface area of habitats supported to attain a better conservation status

Example 3: Human Resources Development Education and Lifelong Learning - Greece

Aim of the programme: to cut unemployment, focus on creating quality education opportunities, skills upgrading and sustainable employment for all with a view to enhancing social cohesion. The main beneficiaries of the planned actions include young people not in education, employment and training (NEETs) from 15-24 and from 25-29 years old, the long-term unemployed, women, unemployed people with low qualifications and unemployed 30-44 year-olds, pupils and students at all levels of education, teachers and researchers.

Funding:

Total OP budget: EUR 3.25 billion

Total EU contribution: EUR 2.57 billion, of which ESF EUR 2.07 billion and Youth Employment Initiative EUR 0.50 billion

Targeted expected outcomes:

This programme has the same goals as the national quantitative objective set by the Europe 2020 Strategy:

1	Increase the employment rate to 70%
2	Reduce the number of people at risk of poverty or social exclusion by 450,000
3	Reduce the early school leaving rate to 9.7%
4	Achieve a tertiary attainment rate of 32%.

The first 10 of the list of 37 detailed indicators used in the performance framework are:

1	Unemployed, including long-term unemployed
2	Long-term unemployed (subset of 'unemployed')
3	Inactive supported
4	Inactive, not in education or training (subset of 'inactive')
5	Employed
6	People above 54 years of age who are unemployed, including long-term unemployed, or inactive not in education or training (subset of 'above 54 years of age')
7	Participants in the training programme (different subsets are used according to job status, education, household situation age, with a migrant status or not, disabled or not)
8	Number of projects fully or partially implemented by social partners or non-governmental organisations
9	Supported micro, small and medium-sized enterprises (including cooperative enterprises, enterprises of the social economy)
10	Unemployed participants who receive an offer of employment, continued education, apprenticeship or traineeship upon leaving

Example 4: Regional Development Programme – Bourgogne, France

Aim of the programme: this operating programme covers the entire Europe 2020 Strategy for smart, sustainable and inclusive growth.

Funding:

Total OP budget: EUR 0.60 billion

Total EU contribution: EUR 0.23 billion, of which: ERDF EUR 0.18 billion, ESF EUR 0.04 billion and Youth Employment Initiative EUR 0.01 billion

Targeted expected outcomes:

1	Increase in the number of public patents and licences by 15% per year between 2010 to 2020
2	Increase in the rate of enterprises' survival by 3%
3	Increase of up to 50% in the number of households connected to very high-speed network outside areas managed by private operators
4	Reduce greenhouse emissions by 6300 tonnes CO^2
5	Increase in the production of renewable energies by an additional 15 MW
6	Increase in housing energy efficiency benefitting 2800 households
7	• Increase in the surface of depolluted brownfields by an additional 5 ha
8	• Increase in the biotopes in a better condition with 6800 additional square km
9	• Increase in the number of unemployed people receiving a job after a training programme (+9600)

The first 10 of the list of the 47 detailed indicators used in the performance framework:

1	Migrants, participants with a foreign background, minorities (including marginalised communities such as the Roma)
2	Participants with primary or lower secondary education
3	Above 54 years of age
4	Renewables: additional renewable energy production capacity
5	Start-ups supported
6	Other disadvantaged
7	All firms receiving support
8	Private investment matching public support to enterprises (non-grants)
9	Participants gaining a qualification upon leaving
10	Participants with disabilities

Sources: ESIF 2014-2020 dataset, available at https://cohesiondata.ec.europa.eu/2014-2020/ESIF-2014-2020-Achievement-Details/aesb-873i, European Structural and Investment Funds Data and European Commission Cohesion Data, https://ec.europa.eu/regional_policy/EN/atlas/programmes/2014-2020/romania/2014ro16m1op001 and https://cohesiondata.ec.europa.eu/programmes/2014RO16M1OP001

3. ANALYSIS OF PROJECT CHARACTERISTICS

KEY FINDINGS

- Because of econometric problems with standard methodologies used in the literature, we adopted a novel methodology by first estimating 'unexplained economic growth' by controlling for the influence of various region-specific factors and then analysing its relationship with about two-dozen project-specific characteristics.
- Among the funds (ERDF, EARDF, ESF and CF), only the CF is positively associated with unexplained economic growth. The relative importance in a region of interregional projects (part of the ERDF) is also robustly associated with higher unexplained economic growth.
- Lower national co-financing rates are correlated with higher unexplained economic growth, as are a higher proportion of non-research NGOs and private-sector entities among the beneficiaries (as opposed to public-sector beneficiaries).
- The best-performing regions have longer duration projects, while the budgets of programmes in the best-performing regions are more concentrated on a few priorities. These findings suggest that strategic and focused programmes and projects have benefits.
- The best-performing regions have more inter-regional projects.
- National management of projects is more widespread in countries that have more best-performing regions in Europe.
- The role of different sectors in unexplained economic growth is ambiguous, hinting that the success of sectoral investments is highly dependent on regional characteristics.

METHODOLOGY

As we argued in our literature review, there are substantial identification issues when conducting econometric analyses to assess the impact of cohesion policy. This is particularly the case when the outcome of interest is at an aggregated level – such as the impact of EU funds on convergence – as opposed to micro impact evaluation of a particular programme or project.

Bearing in mind such limitations, we have instead chosen to study the possible impact of cohesion project characteristics in a novel way. We identified NUTS-2 regions, which had the best and the worst GDP growth performance, conditional on a wide range of regional factors, and then studied if various project characteristics differ between the best and the worst performers.

We highlight upfront that GDP growth is not the sole indicator of a programme's success. Several programmes aim to preserve the environment, foster urban development or promote social inclusion. Such programmes, while being helpful, might not lead to an immediate uptick in economic growth. However, a major aim of cohesion policy is to foster convergence, and "*In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of*

the least favoured regions"[11]. As we show later in this chapter, most cohesion funding is indeed spent on less-developed regions. Therefore, while economic convergence is far from being the only objective, is remains the most important objective of cohesion policy.

In our empirical work, we first carried out a conditional convergence analysis without considering cohesion policy indicators. We thus ran regressions of the growth rate of GDP per capita at PPS (purchasing power standards) between 2003 and 2015 on a number of fundamentals, which, according to classic economic theory, should explain the different growth paths. We found significant influence of:

- the initial level of GDP PPS per capita in 2003,
- the capital income ratio in 2003,
- the percentage of employment in the tertiary sector in 2003,
- the growth in population between 2000 and 2003,
- population density in 2003,
- quality of governance in 2010,
- the percentage from 25-64 year olds with tertiary education in 2003,
- R&D personnel in percentage of total employment in 2003, and
- the growth of tertiary sector employment in 2003-2015.

Other variables, which were tested, but were not significant, included:

- business demographics,
- health indicators, and
- a dummy for whether a region is rural.

We did not control for factors contemporaneous to the period of growth analysed – 2003 to 2015. There are only two exceptions: (1) the earliest regional institutional quality data we used is available for 2010, and (2) we controlled for the growth of the tertiary sector from 2003 to 2015. Regarding the former, using the 2010 value as a determinant for 2003-2015 growth might include an endogeneity problem[12] if economic growth from 2003 to 2010 influenced institutional quality in 2010. However, since institutional quality is rather persistent and the sample period for our dependent variable is 2003-2015, this potential problem is most likely rather small. Regarding the latter indicator, such a structural transformation is a powerful driver of economic growth and it is important to include it in the regression. In terms of the identification of best and worst performing regions, it is reasonable to assume that project characteristics do not have a substantial impact on such broad structural shifts in the economy.

A detailed analysis of the regressions is provided in Annex 2. We ran our regressions using both NUTS-2 and NUTS-3 level data and found rather similar results. While most of the variables had statistically

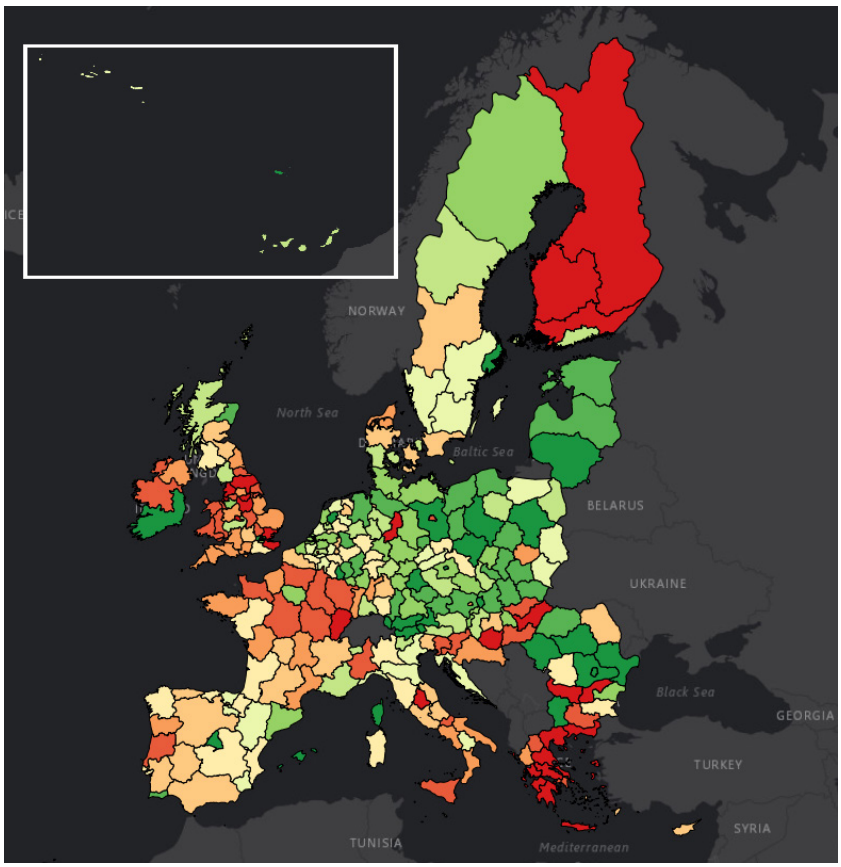
[11] Endogeneity bias in an econometric regression estimation occurs when the dependent variable (for example, economic growth) and an explanatory variable (for example, a cohesion policy variable) simultaneously cause each other.
[12] Article 174 of the Treaty on the Functioning of the European Union.

significant estimates using both levels of regional aggregation, NUTS-3 estimates were even more significant in a statistical sense, possibly because of the much larger number of observations.

While we ran our regressions using both NUTS-2 and NUTS-3 level data, we were compelled to use NUTS-2 data for our analysis of project characteristics, because information on EU funding and the project-level data in one of the two main datasets (the '4P dataset', see in Section 3.2) is available only for the NUTS-2 level. Therefore, we report NUTS-2 results in the main part of this report. However, the other project level dataset, which includes only inter-regional projects, is also available at the NUTS-3 level. In Annex 3 we conclude that our findings are robust against use of NUTS-2 or NUTS-3 levels of data from this dataset.

We ran various alternative regression specifications and ended up with a final specification (see Annex 2). The residuals of our regression correspond to the part of economic growth left unexplained by the variables we included, and we call this unexplained part 'unexplained economic growth'. It corresponds to the 'extra growth', left unexplained by the various fundamentals included in our regression, and which might be related to cohesion policy. Figure 1 shows NUTS-2 regions in the EU according to their unexplained economic growth.

Figure 1: Unexplained economic growth: Classification of EU NUTS-2 regions according to growth in 2003-2015 when controlling for various initial conditions



Note: Map based on deciles of the residuals of the EU conditional convergence model presented in Annex 2, Table 14: model 3. Regions in dark green had the fastest unexplained economic growth, while regions in dark red the slowest.

We considered 271 European NUTS-2 regions. Of these, the top decile of 27 regions comes from 17 countries, highlighting that there are rather successful regions, in terms of unexplained economic convergence, in many EU member states. The unlucky group of the 27 worst regions is from eight countries, suggesting more concentration. In particular, nine of the 13 Greek regions are in the bottom decile. Among the other four Greek regions, two are in the second worst decile, one in the third worst and one in the fourth worst, highlighting that Greece as a country suffered massively after 2008. Because of the special Greek economic and social collapse after 2008, we excluded Greece from our main analysis (see the annex for our regression results both with and without Greek regions).

In this chapter, we compare our estimate of the unexplained economic growth with the regions' cohesion policy project characteristics, in an attempt to uncover interesting patterns, though we cannot claim causality, i.e. that certain cohesion project characteristics explain this extra growth. Other factors might be more important for growth development. For example, on the positive side, that the government attracted large foreign direct investment which boosted production and average productivity in the region; or on the negative side, that there was a major natural disaster. Nevertheless, it is instructive to analyse the best and worst performing regions in terms of the different characteristics of cohesion policy projects. We also discuss certain factors that could explain the associations we found.

We conducted two types of analysis:

i) a correlation analysis across the whole EU, in which we considered all the regions simultaneously to see how their characteristics are correlated with unexplained economic growth, and

ii) a quartile analysis by country, in which we contrasted only the best and worst performers within each country, and then averaged the differences across the EU.

Both approaches have a rationale. Correlation analysis of the full sample of regions can highlight patterns systematically over all regions of the EU. However, it is possible that the association between project characteristics and unexplained economic growth is stronger for the best and the worst performers, but less so for those regions which are in the middle of the growth distribution. Furthermore, country-specific characteristics can also play a role. Therefore, in our second analysis we calculated the difference in project characteristics of the best and worst performing regions for each country, and then averaged these country-specific differences across the EU. Since countries differ in terms of the number of NUTS-2 regions, we considered only those EU countries that have at least four NUTS-2 regions. We consider the top quartile of regions to be the best performers and the bottom quartile of regions to be the worst performers in terms of unexplained economic growth[13].

Table 1 presents the top and bottom quartiles of best and worst performing regions in each country with at least four NUTS-2 regions for our second analysis.

[13] That is, when a country has four NUTS-2 regions, then only the best and the worst regions are considered, but when, for example, a country has 12 NUTS-2 regions, we consider the top three and the bottom three regions.

Table 1: Best and worst regions in terms of unexplained economic growth in each country having at least four NUTS-2 regions

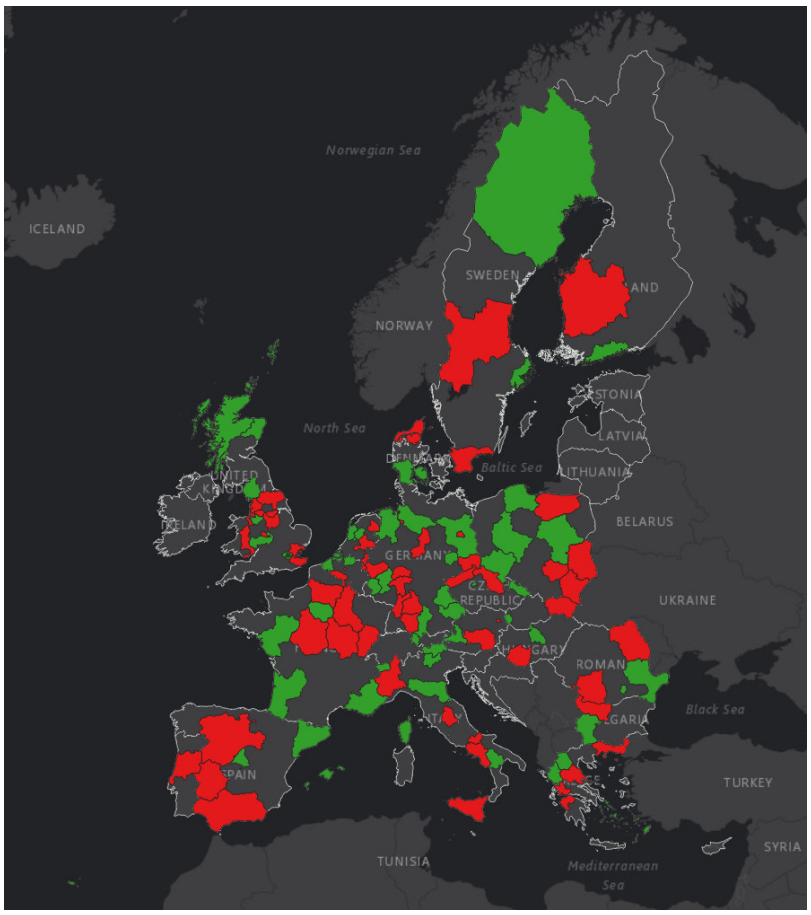
COUNTRY	BEST PERFORMERS (TOP QUARTILE)	WORST PERFORMERS (BOTTOM QUARTILE)
Austria	1. Salzburg 2. Vorarlberg	1. Wien 2. Steiermark
Belgium	1. Prov. Vlaams-Brabant 2. Prov. Antwerpen	1. Région de Bruxelles-Capitale/Brussels Hoofdstedelijk Gewest 2. Prov. Hainaut
Bulgaria	1. Yugozapaden	1. Severozapaden
Czech Republic	1. Praha 2. Moravskoslezsko	1. Severovýchod 2. Severozápad
Denmark	1. Syddanmark	1. Nordjylland
Finland	1. Helsinki-Uusimaa	1. Länsi-Suomi
France	1. Provence-Alpes-Côte d'Azur (NUTS 2013) 2. Pays de la Loire (NUTS 2013) 3. Aquitaine (NUTS 2013) 4. Île de France 5. Corse (NUTS 2013)	1. Franche-Comté (NUTS 2013) 2. Picardie (NUTS 2013) 3. Centre (FR) (NUTS 2013) 4. Bourgogne (NUTS 2013) 5. Champagne-Ardenne (NUTS 2013)
Germany	1. Koblenz 2. Schwaben 3. Weser-Ems 4. Leipzig 5. Trier 6. Brandenburg 7. Niederbayern 8. Lüneburg 9. Oberpfalz	1. Gießen 2. Stuttgart 3. Dresden 4. Braunschweig 5. Karlsruhe 6. Tübingen 7. Bremen 8. Berlin 9. Darmstadt
Greece	1. Notio Aigaio 2. Dytiki Makedonia 3. Ipeiros	1. Thessalia 2. Anatoliki Makedonia, Thraki 3. Dytiki Ellada
Hungary	1. Közép-Magyarország	1. Dél-Dunántúl
Italy	1. Valle d'Aosta/Vallée d'Aoste 2. Basilicata 3. Provincia Autonoma di Trento 4. Provincia Autonoma di Bolzano/Bozen 5. Emilia-Romagna	1. Sicilia 2. Piemonte 3. Campania 4. Umbria 5. Molise
Netherlands	1. Zeeland 2. Noord-Holland 3. Flevoland	1. Limburg (NL) 2. Drenthe 3. Gelderland

COUNTRY	BEST PERFORMERS (TOP QUARTILE)	WORST PERFORMERS (BOTTOM QUARTILE)
Poland	1. Pomorskie 2. Wielkopolskie 3. Dolnoslaskie 4. Mazowieckie	1. Podkarpackie 2. Swietokrzyskie 3. Lubelskie 4. Warminsko-Mazurskie
Portugal	1. Região Autónoma da Madeira	1. Centro
Romania	1. Bucuresti – Ilfov 2. Sud-Est	1. Nord-Est 2. Sud-Vest Oltenia
Slovakia	1. Bratislavský kraj	1. Východné Slovensko
Spain	1. Comunidad de Madrid 2 Cataluña 3. Illes Balears 4. Ciudad Autónoma de Ceuta	1. Castilla y León 2. Ciudad Autónoma de Melilla 3. Cantabria 4. Comunidad Foral de Navarra
Sweden	1. Stockholm 2. Övre Norrland	1. Norra Mellansverige 2. Sydsverige
United Kingdom	1. Outer London - West and North West 2. Cheshire 3. Outer London - East and North East 4. Highlands and Islands 5. Outer London - South 6. Cumbria 7. Inner London – East 8. Herefordshire, Worcestershire and Warwickshire 9. North Eastern Scotland 10. Inner London - West	1. Kent 2. Derbyshire and Nottinghamshire 3. Lancashire 4. Greater Manchester 5. North Yorkshire 6. Essex 7. West Midlands 8. East Wales 9. South Yorkshire 10. Merseyside

Note: Classification is based on the EU conditional convergence model presented in Annex 2, Table 14: model 3.

In Figure 2 we visualise the location of the best and worst regions by country in terms of unexplained economic growth, which suggests different geographical patterns across countries.

Figure 2: Regions in the first and last quartiles within each country in terms of unexplained economic growth (in countries with at least four NUTS-2 regions)



Note: Classification is based on the EU conditional convergence model presented in Annex 2, Table 14: model 3. Regions in green are in the top quartile within a country, while regions in red are in the bottom quartile.

PROJECT CHARACTERISTICS CONSIDERED

The publicly available data on project characteristics can be grouped essentially into three categories: payments by EU fund, interregional project characteristics and summary project characteristics (including sectoral breakdown).

Payments by fund to each region are available via the DG REGIO data for research platform (https://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/) under the name 'Historic EU payments – regionalised and modelled'[14]. On project characteristics, however, readily available public data at regional level is scarce. The European Commission aggregates data at programme level, not allowing for detailed regional comparisons. We therefore combined two datasets that we refer to as the 4P dataset and the interregional database. Neither is ideal in its coverage of

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

projects, but both provide different insights into project characteristics conducive to unexplained economic growth.

One data source, which we designate the '4P dataset', comes from the European Commission Regional Policy website (https://ec.europa.eu/regional_policy/en/atlas/), where up to four projects per NUTS-2 region are listed and explained in detail. These same projects can be found by accessing https://cohesiondata.ec.europa.eu/projects, where it states "*This is a list of representative projects funded by ESIF. It is not an exhaustive list of all projects*". We have to presume that the sample is indeed representative of projects, even though it is not representative of the funds: of the 606 projects listed, 504 are funded by the ERDF, 51 by the Cohesion Fund, 11 by the ESF, and two by the pre-accession instrument, while the fund is not indicated for 38 projects[15]. However, as long as the criteria for selecting projects is not related to the characteristics analysed, or to unobservables affecting unexplained economic growth, the correlations should still convey significant information[16]. The 606 projects refer to the 2007-2013 Multiannual Financial Framework (MFF) period and their combined budget amounts to 3.2% of the total ESIF budget in 2007-2013.

The other dataset, which we designate as the 'interregional dataset' (https://www.keep.eu/), contains projects from interregional programmes from the European Regional Development Fund (ERDF). These include cross-regional initiatives (within a country) and international initiatives. We focus on data from the 2007-2013 period, for which the database includes 10,089 projects in total, corresponding to 94% of the total number of interregional projects under the ERDF in this programming period – thus its coverage is almost complete.

We highlight that these two datasets relate to different sets of projects. The interregional dataset covers only projects that involved interregional cooperation and that were ERDF-funded, while the 4P dataset covers projects from all ESIF funds (even though it is dominated by the ERDF, as we noted above), and these projects can be of any type, either region specific or interregional. Thus, findings might not necessarily point in the same direction. In Table 2, we list the variables we were able to construct from these sources. We analyse whether these variables are relevant for project success.

[15] While there are 606 unique projects in this dataset, many of them are interregional and thereby all together there are 896 project+region pairs. In our analysis we consider an interregional project for each region it targets.
[16] This argument is analogous to the justification of the use of instrumental variables in econometrics.

Table 2: Fund payments variables

NAME	DEFINITION	SOURCE
Payments Cohesion Fund/ERDF/EAFRD/ESF (per capita)	Total payments to the region under each of the funds (divided by population)	DG REGIO Data for research, 'Historic EU payments - regionalised and modelled'
Concentration of priorities of programmes under the ERDF and the Cohesion Fund	Theil index for equality of budget shares amongst priorities[17]. The higher the value, the more focused programmes are in terms of priorities. A lower value means a higher diversification.	DG REGIO Data for research, 'Database of the cumulative allocations to selected projects and expenditure at NUTS2'

Table 3: Project characteristics variables

NAME	DEFINITION	SOURCE	
		INTERREGIONAL	4P
SHARE OF INTERREGIONAL PROJECTS FROM ERDF			
Estimated INTERREG budget	Project budget estimated to have been allocated to the region[18]	Y	N
Estimated INTERREG budget (leader)	Project budget by region's lead partner[19]	Y	N
No. of INTERREG projects	Number of projects per region part of INTERREG programmes	Y	N
No. of INTERREG projects (leader)	Number of projects per region part of INTERREG programmes in which the lead partner is in the region	Y	N
Proportion of leadership	Proportion of INTERREG projects in which the lead partner is the region	Y	N

[17] The priorities can be found in the file 'categorisation_2014_2020_mapping.xls' also available at https://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/.

[18] The interregional keep.eu database only has total budget at project level, not its breakdown by region. In order to approximate the regional breakdown, we assumed that the project's budget is equally distributed between partners and we added up the budgets of each partner in a NUTS-2 region. For example, if 50 percent of a project's partners are in a given NUTS-2 region, 50 percent of the project funds were assumed to be allocated to that region.

[19] The keep.eu database only has total budget at project level, not is breakdown by region. Under this variable, a project's budget was allocated entirely to the region of the lead partner. It is therefore the total budget of projects in which the region is a lead partner.

NAME	DEFINITION	SOURCE	
		INTERREGIONAL	4P
Estimated INTERREG budget per capita	Project budget estimated to have been allocated to the region divided by population	Y	N
No. of INTERREG projects per capita	Number of projects per region part of INTERREG programmes divided by population	Y	N
PROJECT CHARACTERISTICS			
Duration	Average duration of projects (end date – start date) in the NUTS-2 region	Y	Y
Co-financing	Average percentage of funds provided by regional or national entities across projects	Y	Y
Co-financing (leader)	Average percentage of funds provided by regional or national entities across projects in which the region is the lead partner	Y	N
Number of related themes	Average number of themes (sectors) named as project priorities	N	Y
BENEFICIARIES			
No. of beneficiaries	Average number of entities receiving funds under projects	Y	Y
Private beneficiary proportion	Average proportion of entities receiving funds which are private companies	N	Y
NGO beneficiary proportion	Average proportion of entities receiving funds which are non-research NGOs	N	Y
Public beneficiary proportion	Average proportion of entities receiving funds which are part of public administration	N	Y

NAME	DEFINITION	SOURCE	
		INTERREGIONAL	4P
Academia beneficiary proportion	Average proportion of entities receiving funds which are primarily research institutions	N	Y
MANAGING AUTHORITIES			
No. of managing authorities	Average number of authorities managing a project	N	Y
National proportion	Average proportion of managing authorities which are national ministries	N	Y
Non-national proportion	Average proportion of managing authorities which are regional/local (including regional ministries in federal states)	N	Y
SECTORIAL BREAKDOWN			
Overall Proportion in Environment/Innovation/etc.	Percentage of projects which have as one of the named themes environment/Innovation/etc. (not mutually exclusive)	Y	Y
First priority Relative budget in Environment/Innovation/etc.	Percentage of budget allocated to first priority (mutually exclusive)	Y	N
First priority Proportion in Environment/Innovation/etc.	Percentage of projects which have as first thematic Environment/Innovation/etc. (mutually exclusive)	Y	Y

UNEXPLAINED ECONOMIC GROWTH AND FUND TYPE

It is first important to highlight that commitments remain tied to the level of regional development, with less-developed regions (with GDP per capita at PPS below 75% of the EU average) receiving much higher amounts from the ERDF and ESF in total and as a proportion of GDP, as shown in Table 4. Furthermore, only countries with GDP per capita below 90% of the EU average are eligible for Cohesion Fund payments, which further increases the amounts received by less-developed regions (Table 5). More developed regions (with GDP per capita at PPS over 90% of the EU average), on the other hand,

receive very little as a share of GDP, just 0.07%. Given this low share, it is unlikely that EU cohesion funds have a material impact on GDP growth in more developed regions. Therefore, as a robustness analysis, we studied the association between unexplained economic growth and project characteristics by excluding more developed regions (see Annex 4). We found that our results are robust.

Table 4: Commitment appropriations for ERDF and ESF by type of region, MFF 2014-2020

	Combined nominal GDP 2014-2020 in EUR billions	Combined commitments for ERDF and ESF, current prices, in EUR billions	ERDF and ESF commitments over nominal GDP, 2014-2020
Less developed	11 169	179	1.61%
Transition	11 921	37	0.31%
More developed	85 042	56	0.07%

Source: Eurostat's 'Gross domestic product (GDP) at current market prices by NUTS 2 regions [nama_10r_2gdp]' database for nominal GDP in 2014-2016, while the 2017-2020 regional GDP values are assumed to grow at the same rate as the GDP growth of the country, for which we used the November 2018 European Commission forecast. The source of EU budget commitments is the European Commission

(**Source:** https://ec.europa.eu/regional_policy/en/funding/available-budget/)

Table 5: Commitments appropriations for the Cohesion Fund, MFF 2014-2020

	Combined nominal GDP 2014-2020 in EUR billions	Commitments for Cohesion Fund, current prices, in EUR billions	Cohesion Fund commitments over nominal GDP, 2014-2020
Cohesion Fund countries	11 977	63	0.53%

Source: November 2018 forecast of the European Commission for combined nominal GDP for countries receiving Cohesion Funds (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia). The source of EU Cohesion commitments is the European Commission (**Source:** https://ec.europa.eu/regional_policy/en/funding/available-budget/).

It is an important question whether EU funding is associated with higher unexplained economic growth. Table 6 shows that only the funding received by a region under the Cohesion Fund is statistically significant when considering the correlation with a region's unexplained economic growth, with the correlation being positive. The absolute value paid into a region in the 2007-2015 period had a correlation of 0.326 with unexplained economic growth, while per capita, the correlation decreased to 0.201, which is still highly significant. A possible explanation for the lack of statistically significant

correlation for the other three funds could be their more diverse goals, including environmental protection and social inclusion, which might not immediately lead to faster economic growth.

Table 6: Correlation between unexplained economic growth and funds received in euros (either total for the region or per capita)

	COHESION FUND		ERDF		EAFRD		ESF	
	Correlation coefficient	p-value	Correlation coefficient	p-value	Correlation coefficient	p-value	Correlation coefficient	p-value
2007-2015, total	**0.326**	**0.002**	0.043	0.491	0.026	0.683	-0.02	0.752
2007-2015, per capita	**0.201**	**0.001**	0.061	0.331	0.004	0.947	-0.042	0.501
2007-2013, total	**0.345**	**0.001**	0.033	0.599	0.037	0.554	-0.077	0.216
2007-2013, per capita	0.13	0.234	0.006	0.92	-0.013	0.832	-0.058	0.354
2003 - 2015, total	**0.326**	**0.002**	-0.022	0.724	-0.005	0.942	-0.027	0.665
2003-2015, per capita	0.127	0.243	0.006	0.93	-0.014	0.825	-0.058	0.352

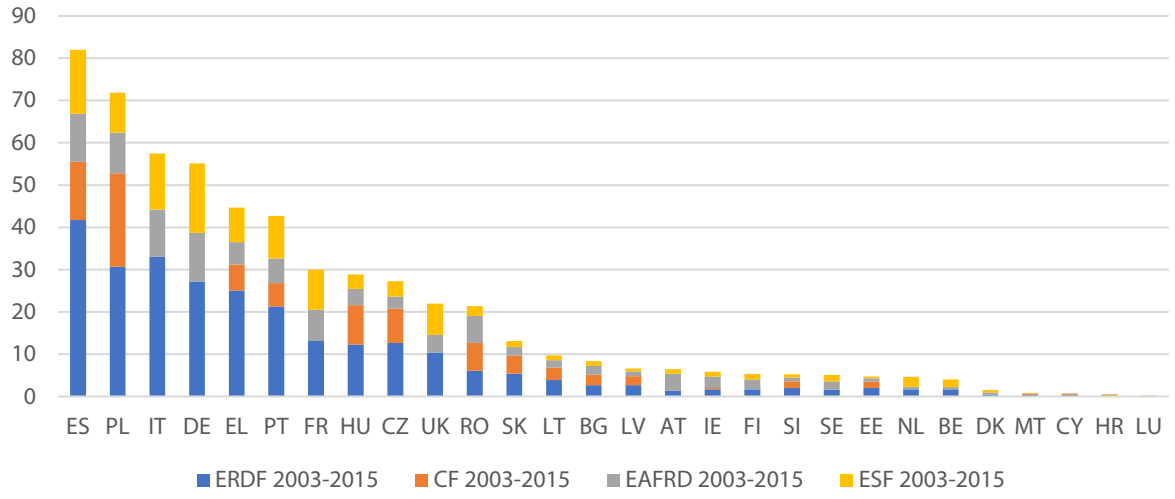
Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and funds received in euros (either total for the region or per capita, and in different periods, as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates, which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel.

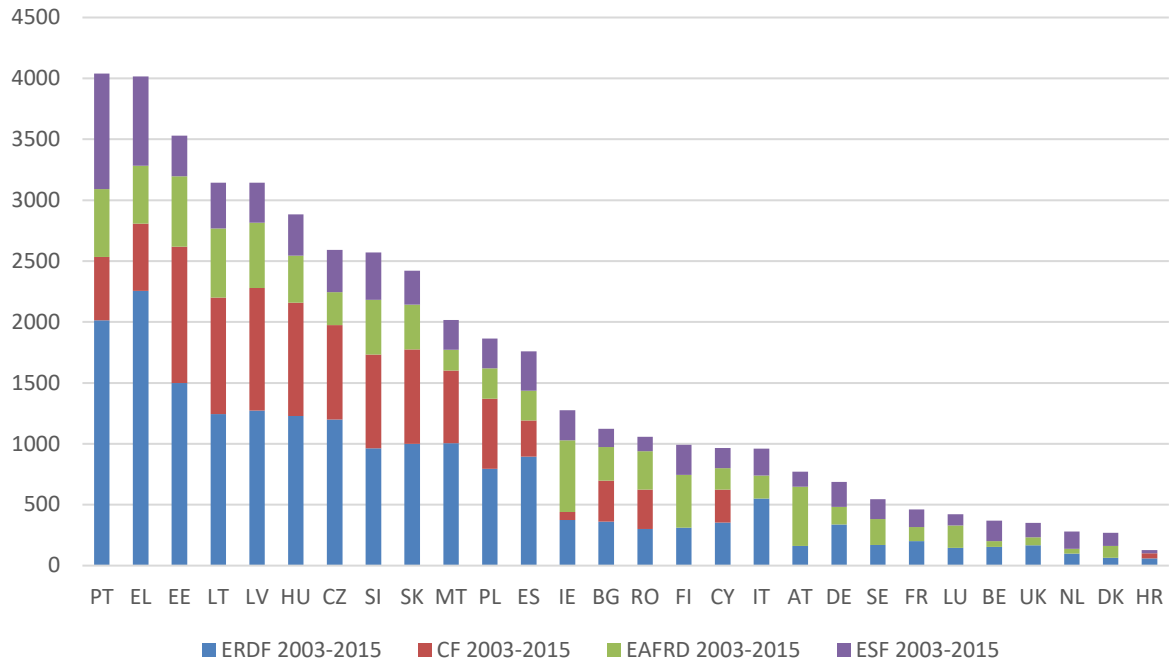
A possible concern with such an analysis is that the regional differences found are mostly explained by differences in how countries absorb funds. However, there does not appear to be clear country-level association between the variables constructed and unexplained economic growth. In terms of allocation of the Cohesion Fund, in per capita terms in our full sample period of 2003-2015, Poland and Spain are not substantially far apart (and Portugal received much more than Poland), while Polish regions fare much better in terms of unexplained economic growth.

Figure 3: Total disbursement per fund, 2003-2015

(A) billion euros



(B) Euros per capita



Source: Total disbursement per fund comes from DG REGIO's 'Historic EU payments - regionalised and modelled'. Total population is total population in 2010 according to Eurostat's Average annual population by NUTS3 regions [nama_10r_3popgdp].

Although the funds received under the ERDF as a whole are not statistically associated with unexplained economic growth, projects under the interregional umbrella do appear to be correlated. Table 7 shows how the total number of interregional projects and an estimate of how much budget goes into the region correlate positively with the region's unexplained economic growth. The estimated correlation coefficients are statistically larger than zero irrespective of whether we use the

total budget/number of projects (first two data lines) or express them in *per-capita* terms (the next two data lines), though the results are statistically more significant in the latter case. Table 7 also shows that it is the participation in inter-regional projects, but not their leadership, that matters: the three indicators related to leadership of interregional projects are not statistically significantly correlated with unexplained economic growth.

Table 7: Correlation between unexplained economic growth and various indicators related to interregional funds

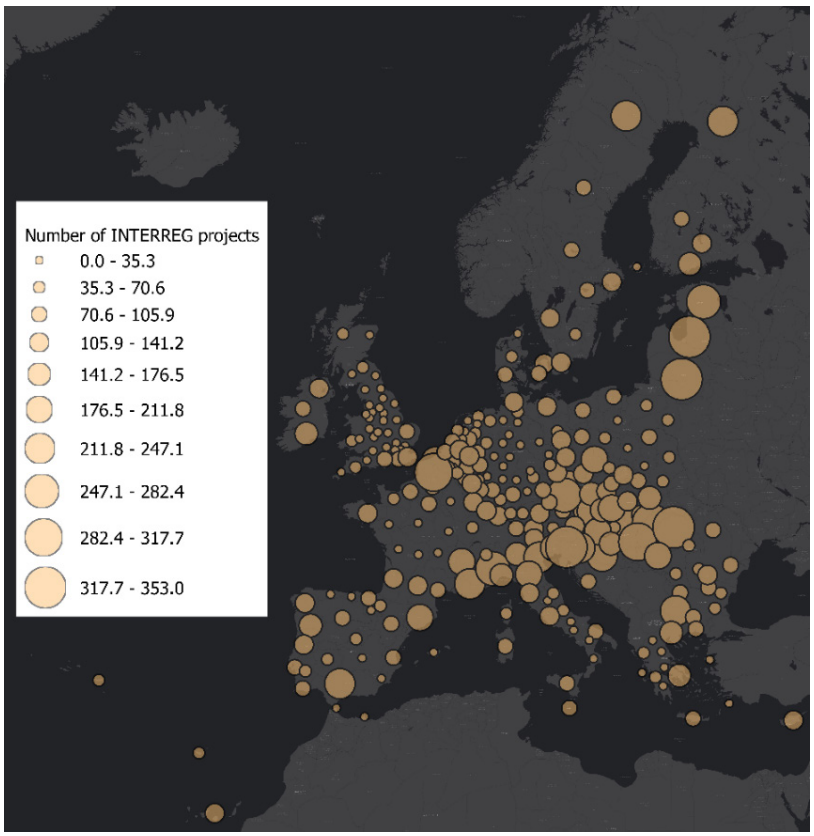
	Correlation coefficient	p-value
Estimated INTERREG budget	**0.124**	**0.047**
Number of INTERREG projects	**0.114**	**0.067**
Estimated INTERREG budget per capita	**0.168**	**0.007**
Number of INTERREG projects per capita	**0.166**	**0.008**
Estimated INTERREG budget from projects where the region is the lead partner	0.061	0.347
Number of INTERREG projects where the region is the lead partner	0.029	0.653
Proportion of projects where the region is the lead partner	-0.049	0.452

Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to interregional funds (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

The distribution of interregional projects shows a concentration of projects in central Europe in particular, but there are also large numbers of such projects in southern France and northern Italy, and in northern France, Belgium and the Netherlands (Figure 4).

Figure 4: The distribution of 2007-2013 interregional projects by NUTS-2 regions



Source: Bruegel

UNEXPLAINED ECONOMIC GROWTH AND PROJECT CHARACTERISTICS

We now dig deeper into the analysis of project characteristics. Table 8 and Table 9 show some key results.

Table 8: Correlation between unexplained economic growth and summary project characteristics (interregional dataset)

	Correlation coefficient	p-value
Duration	-0.082	0.189
National co-financing (general)	**-0.111**	**0.075**
National co-financing (leader)	**-0.110**	**0.077**
Concentration of priorities	-0.024	0.697
No. of beneficiaries	-0.065	0.298

Note: National co-financing (general) is the average co-financing rate of projects in which an entity of the NUTS-2 region is involved, while national co-financing (leader) is the average co-financing rate of projects in which an entity of the NUTS-2 region is the lead partner of the project. The Concentration of Priorities is a measure of how balanced the priorities tackled by programmes are in terms of allocated budget (see

Table 2). Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to project characteristics from the interregional dataset (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates, which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

Table 9: Correlation between unexplained economic growth and summary project characteristics (4P dataset)

	Correlation coefficient	p-value
Duration	**0.197**	**0.004**
National co-financing	**-0.204**	**0.002**
No. of beneficiaries	-0.034	0.611
Private beneficiary proportion	**0.189**	**0.004**
NGO beneficiary proportion	**0.124**	**0.058**
Public beneficiary proportion	0.021	0.746
Academia beneficiary proportion	-0.057	0.385
No. of managing authorities	0.004	0.950
National management proportion	**0.178**	**0.001**
Regional & local management proportion	-0.178	0.001
No. of related sectors	-0.019	0.772

Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to project characteristics from the 4P dataset (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates, which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

Among the most interesting findings, one of the strongest positive correlation coefficients (0.178) is between unexplained economic growth and proportion of projects managed at national level (as opposed to regional and local levels). This might be because of relatively weak local institutions in countries with more room for convergence (e.g. eastern countries), where central ministries possibly are better at absorbing EU funds. At the same time, national entities might be more able to identify and prioritise projects with the greatest potential.

Regions with a higher proportion of projects whose primary beneficiary is a private company (variable 'Private proportion') also perform better, with a 0.189 correlation, which is highly statistically significant. This might be because projects targeting companies are more return-driven and can unlock economic growth, but it might simply be a sign of regions with more positive growth prospects – where more companies exist and thus apply for funds. In our models of unexplained economic growth, we controlled for business demographics (such as birth and death rates of businesses, the population of active enterprises, and employees in the population of active enterprises) and found it not to be a significant factor.

Table 9 also shows that regions with a higher proportion of projects whose primary beneficiary is a non-research NGO (variable 'NGO proportion') also perform better, with a 0.124 correlation coefficient, which is statistically significant.

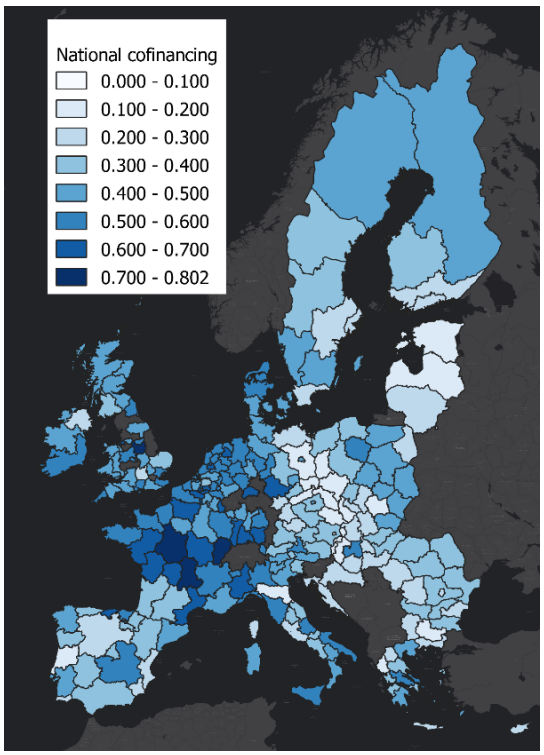
Duration in the 4P dataset is strongly positively associated with unexplained economic growth, with a correlation coefficient of 0.197, potentially hinting at the positive effects of taking a longer-term view of investments. The same duration variable is statistically not significant when using the interregional dataset for all NUTS-2 regions (Table 8), but when we restrict our attention to less-developed regions and use NUTS-3 level data, duration is positively, and statistically significantly, correlated with unexplained economic growth, also for inter-regional projects (Annex 4).

The negative correlation with the national co-financing rate is -0.204 in the 4P database, with a p-value of 0.001 and -0.11 in the interregional database, though only significant at the 8% level. This suggests that a higher share of the EU in the budget is thus associated with stronger growth. This finding might be explained by the availability of funding: when the national co-financing rate is low, national authorities might have more resources to spend on other projects, which might stimulate growth. A key question is whether this result has been driven by the global and European financial and economic crises that intensified after the collapse of Lehman Brothers in September 2008, when several countries faced major public-finance constraints. We return to this issue in our concluding section (section 5).

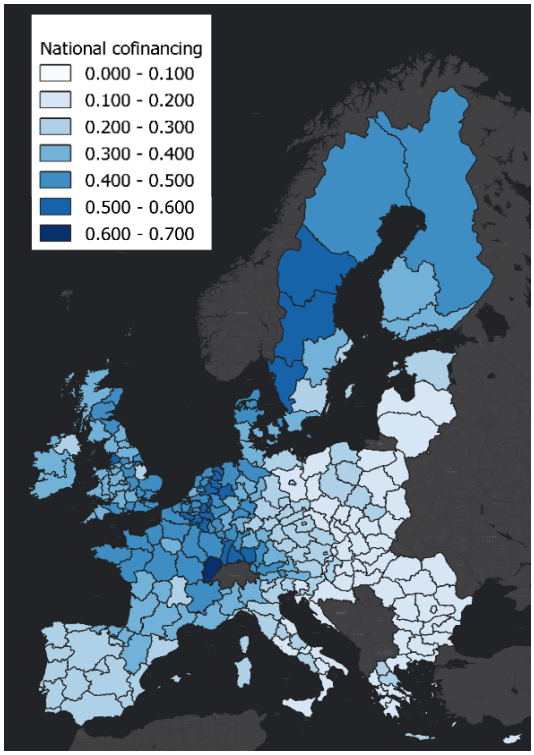
Looking into the national co-financing rate, we see that countries such as Romania and Poland (well represented among the best performers) have quite low average co-financing rates, but so do southern Italian regions (at least for inter-regional projects), which are among the worst performers (Figure 5). Low national co-financing rates are also explained by the period in question, 2007-2013. During the financial crisis, national co-financing rates were reduced, especially for the most affected countries.

Figure 5: Average national co-financing rate across all projects, 2007-2013

(A) 4P dataset



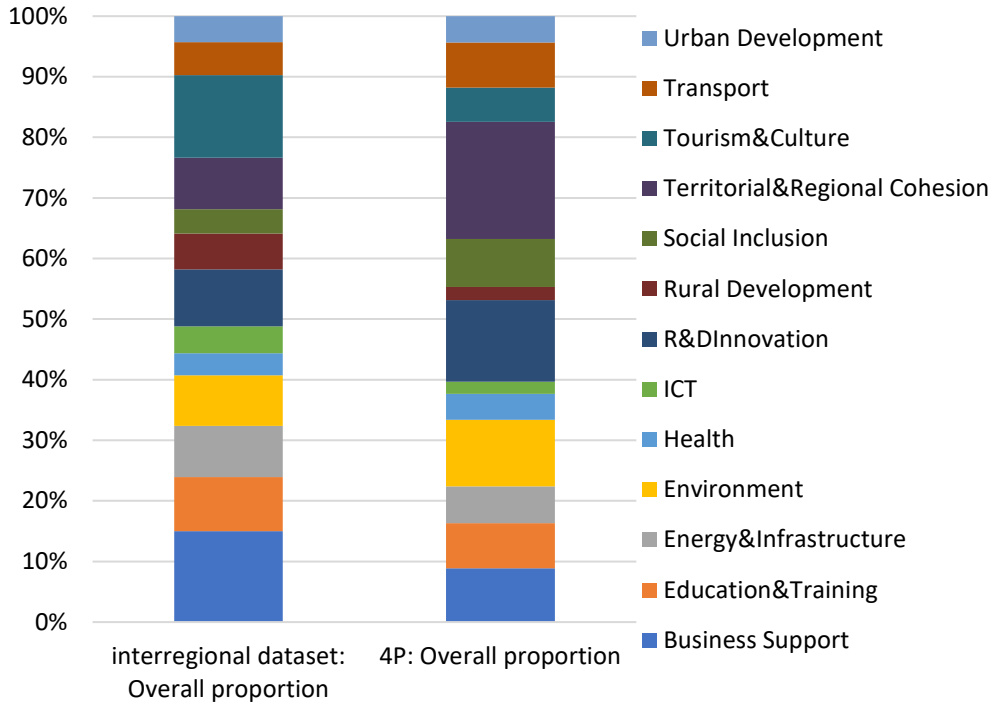
(B) Inter-regional dataset



Source: Bruegel

The sectoral breakdown is relatively consistent across both databases in terms of the percentage of projects in each category (Figure 6).

Figure 6: Sectorial breakdown by the number of projects across datasets



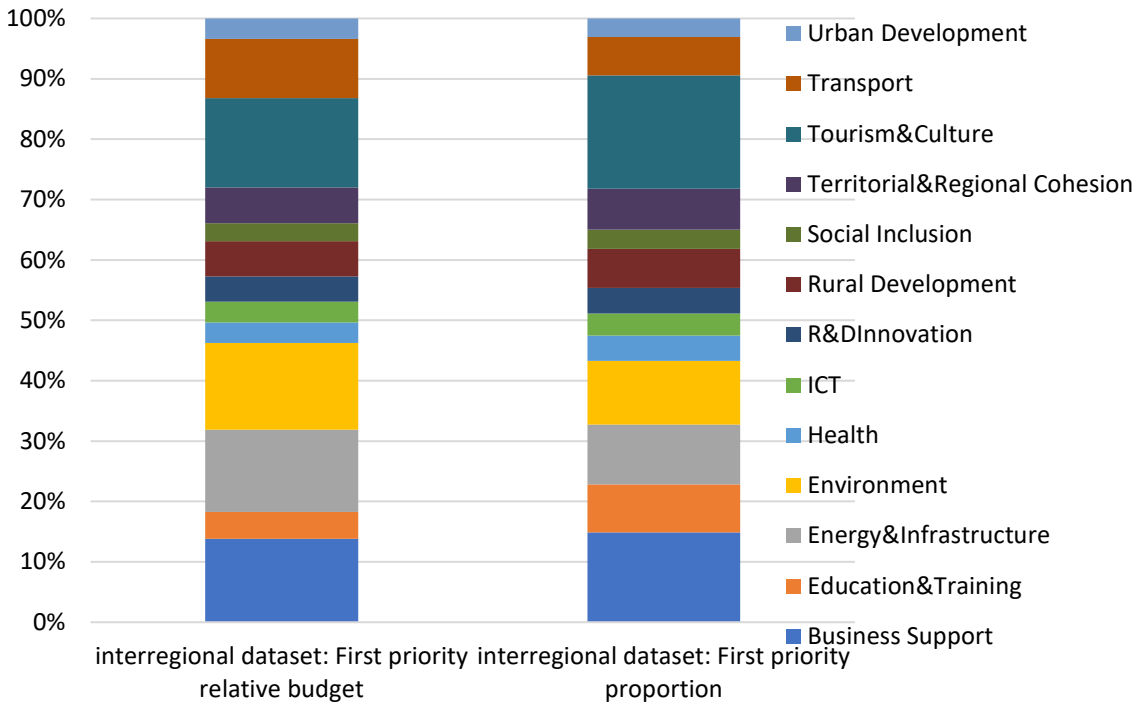
Note: Sectors that were present in only one of the datasets were removed from the breakdown. The breakdown is based on the number of times a priority is mentioned over the total number of priorities mentioned (each project can have between one and three sectors named).

Source: Bruegel.

It is noticeable that the projects in the interregional dataset list 'R&D and innovation' less among their priorities, while they list 'tourism and culture' and 'education and training' considerably more.

Comparing the proportion of projects and the relative budget across sectors based on the first priority alone brings out some interesting aspects (Figure 7). It is noticeable that the 'tourism and culture' projects in the interregional database are less heavily financed compared to other types of projects, given their substantially lower share of the total budget than of the number of projects.

Figure 7: Sectorial breakdown by the number of projects and by the budget of the interregional dataset



Note: This figure considers only the first priority (each project can have between one and three sectors named) and thereby the right column of this chart does not perfectly match the left column of Figure 6.

Source: Bruegel

Figure 7 shows the share of the total budget allocated to each sector (left column) and the proportion of each sector in the total number of projects (right column)[20]. The comparison of the two columns illustrates how expensive or cheap the financing of each priority is relative to other priorities.

[20] Sector allocation is organized on the basis of each project's first priority.

Transport, and energy and infrastructure, for instance, cost relatively more, without being unequivocally associated with more unexplained economic growth (see the analysis below). However, tourism and culture, and education and training appear to be relatively inexpensive areas in which to invest. These results seem rather intuitive, as projects aimed at enhancing immaterial development, such as cultural or educational projects, usually involve lower fixed costs and require softer investments. On top of that, infrastructure and energy projects probably leave less space for incremental investment based on a gradual assessment of intermediate results, thereby hindering the ability to correct for shortcomings in projects' design and/or implementation. In addition, relatively poorer regions might tend to invest more in the hard infrastructure they lack, whereas regions in transition, or relatively more developed, can afford a broader diversification of policy streams, including the financing of projects in the tertiary sector.

In terms of the association of sectors with unexplained economic growth, no clear patterns emerge and the results are conflicting when using the two alternative datasets for project characteristics (Table 10). For example, the share of rural development-oriented projects negatively correlates with unexplained economic growth, but the same correlation is positive when using the 4P dataset. The correlation of the share of environment-oriented projects with unexplained economic growth is positive and significant when using the inter-regional dataset, but negative and insignificant when using the 4P dataset. It should be noted, however, that the primary goal of environment projects is not growth, particularly not in the short/medium term. There are other sectors too, for which the use of the two datasets leads to conflicting results. These findings suggest that the sector of intervention is probably less relevant for economic growth.

Table 10: Correlation between unexplained economic growth and sector breakdown of projects

	PROPORTION (interregional)		PROPORTION (4P)	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Environment	**0.116**	**0.061**	-0.075	0.250
Innovation	-0.079	0.201	0.023	0.725
ICT	**-0.165**	**0.008**	0.010	0.876
Territorial Cohesion	0.002	0.979	-0.002	0.973
Urban Development	-0.009	0.888	0.058	0.373
Rural Development	**-0.142**	**0.021**	**0.109**	**0.096**
Business	**-0.220**	**0.000**	0.033	0.615
Education & Training	0.072	0.248	0.078	0.234
Transport	-0.048	0.448	**0.177**	**0.007**
Energy & Infrastructure	-0.019	0.766	0.077	0.243
Social Inclusion	-0.009	0.879	0.017	0.793
Tourism & Culture	0.120	0.439	-0.082	0.212
Health	0.007	0.906	0.015	0.821

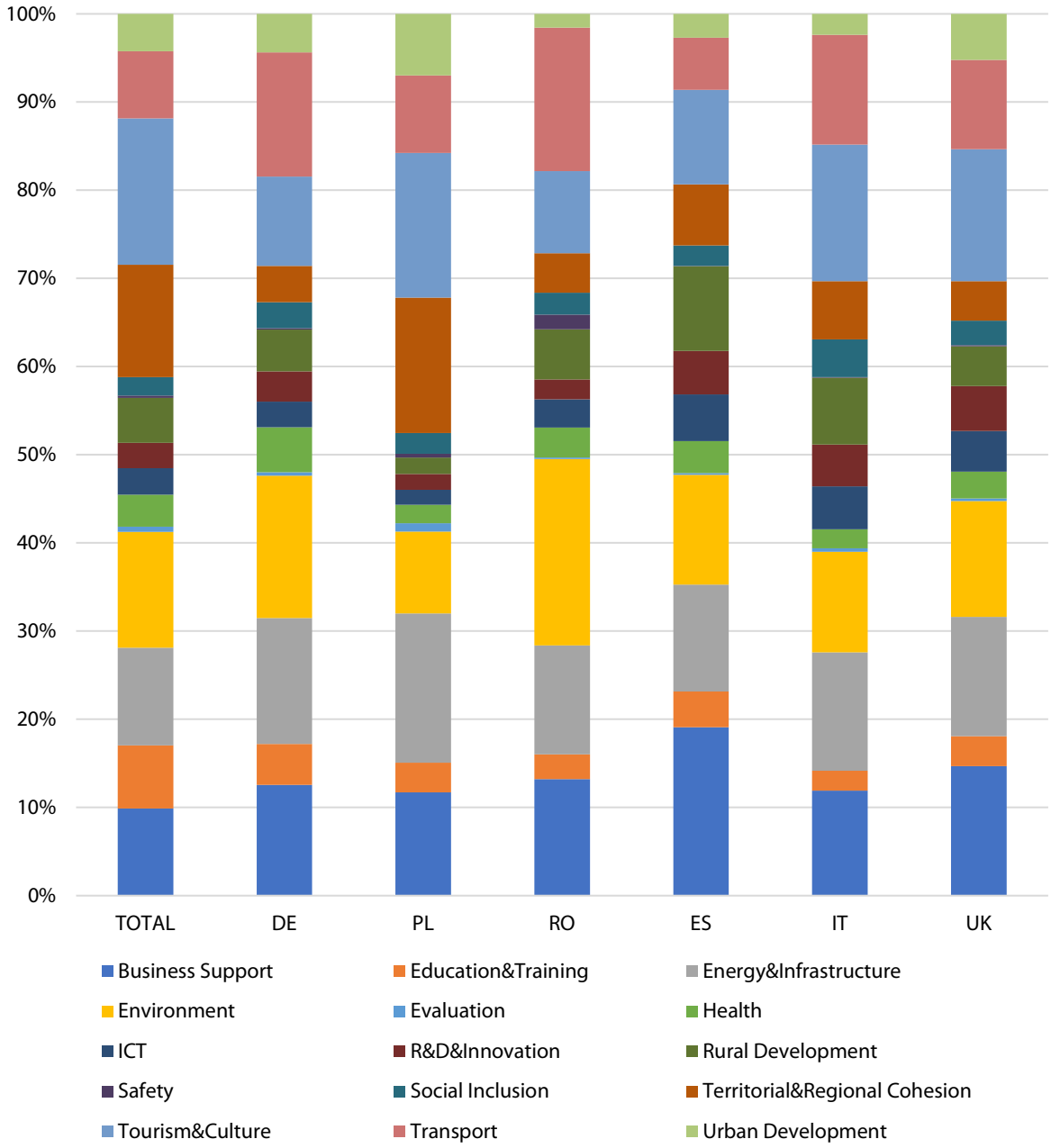
Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and percentage of projects, which include the sector listed on the row labels among its related themes. The p-value

is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates, which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

Still, in terms of sectoral breakdown, it is relevant to see the relative distribution is not markedly different in different countries. Even so, the Romanian situation is worth noting, as it has a substantially higher budget allocated to transport and environment. In Figure 8, we illustrate the sectoral breakdown for some countries, which have experienced different growth paths.

Figure 8: Total budget per NUTS-2 region divided by first priority area, 2007-2013

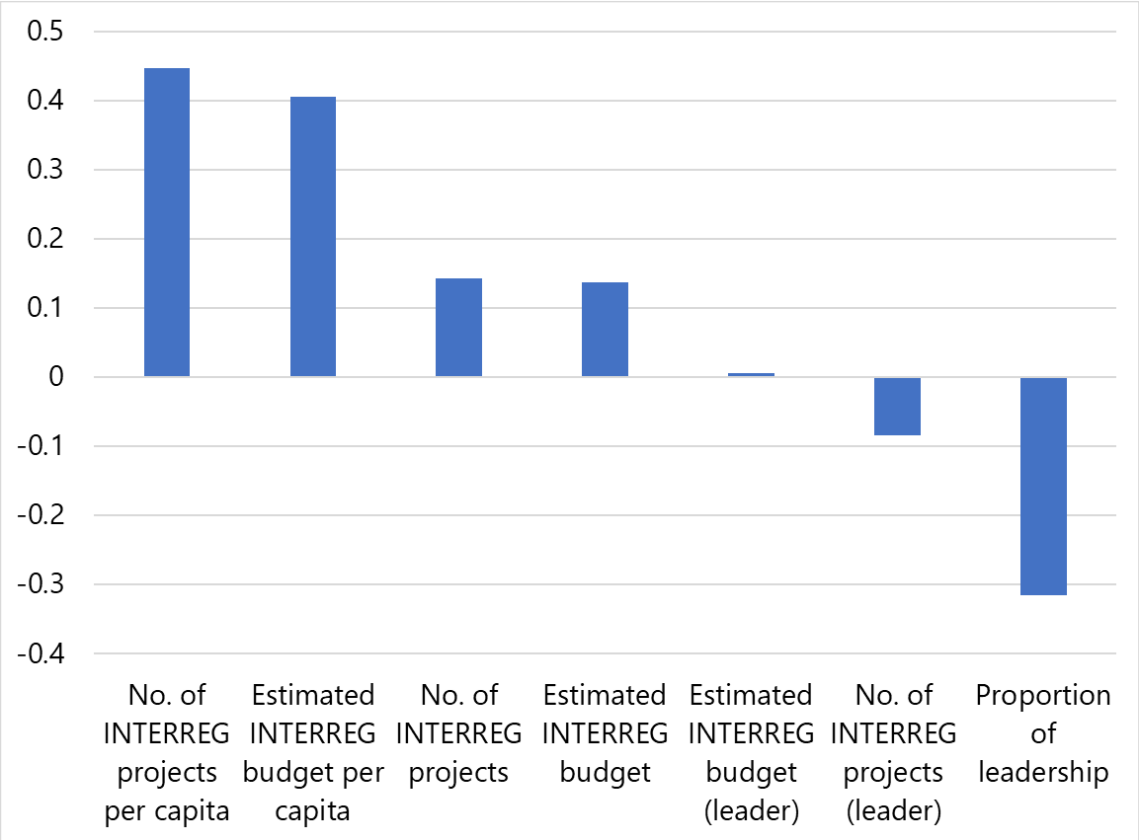


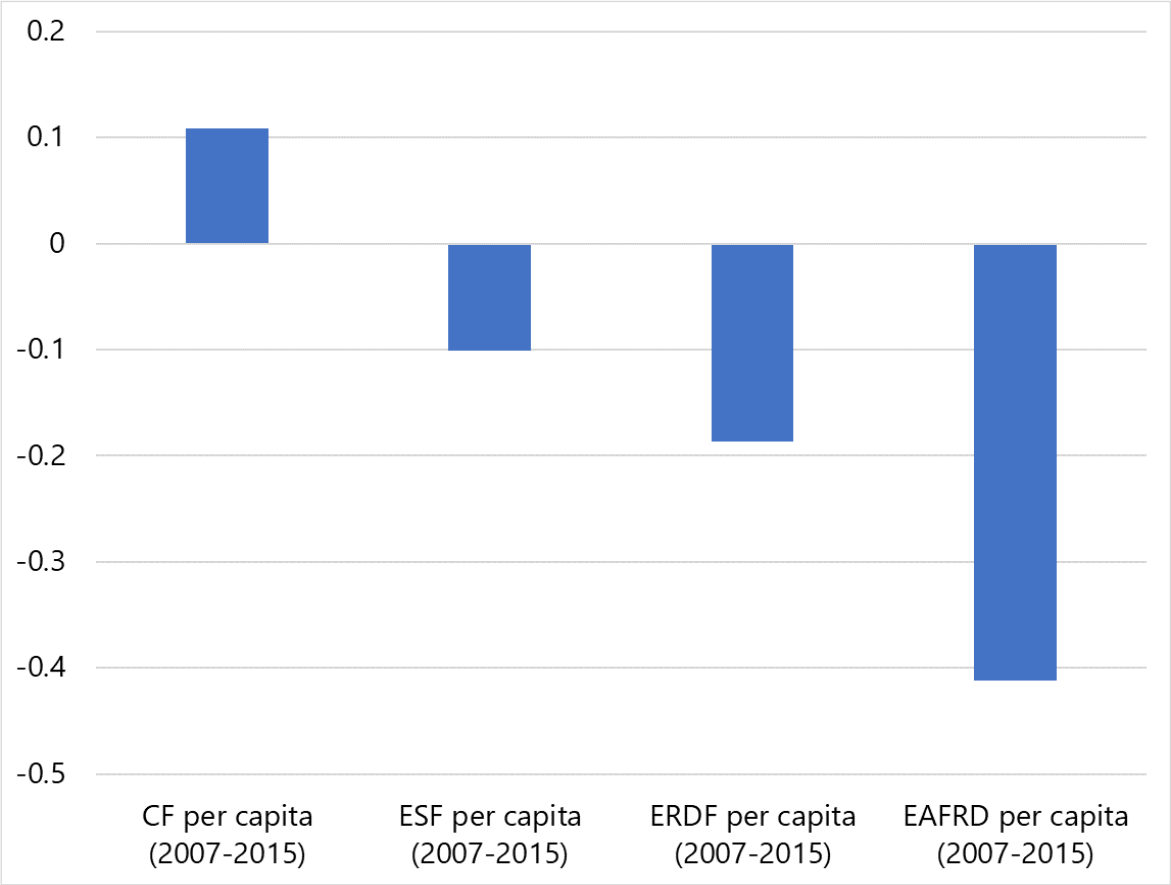
Source: the interregional keep.eu dataset.

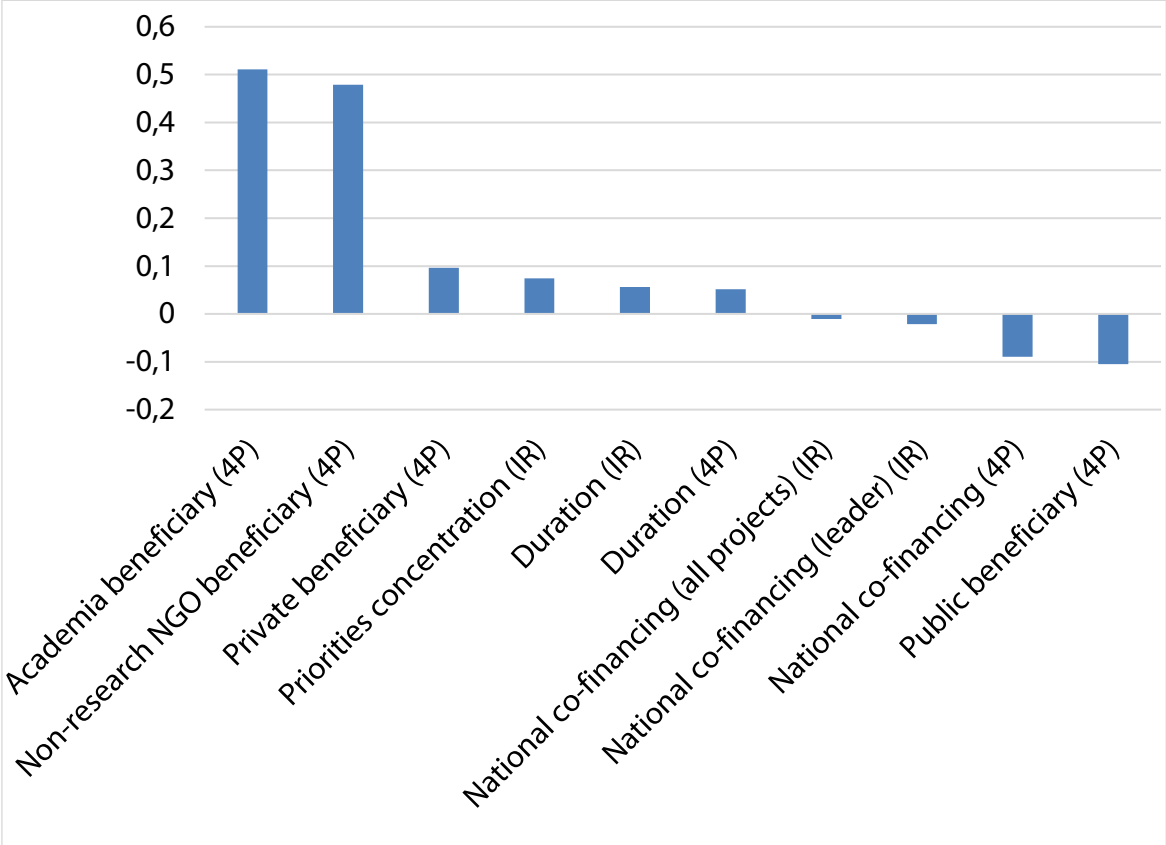
COHESION PROJECT CHARACTERISTICS IN THE BEST AND WORST PERFORMING REGIONS

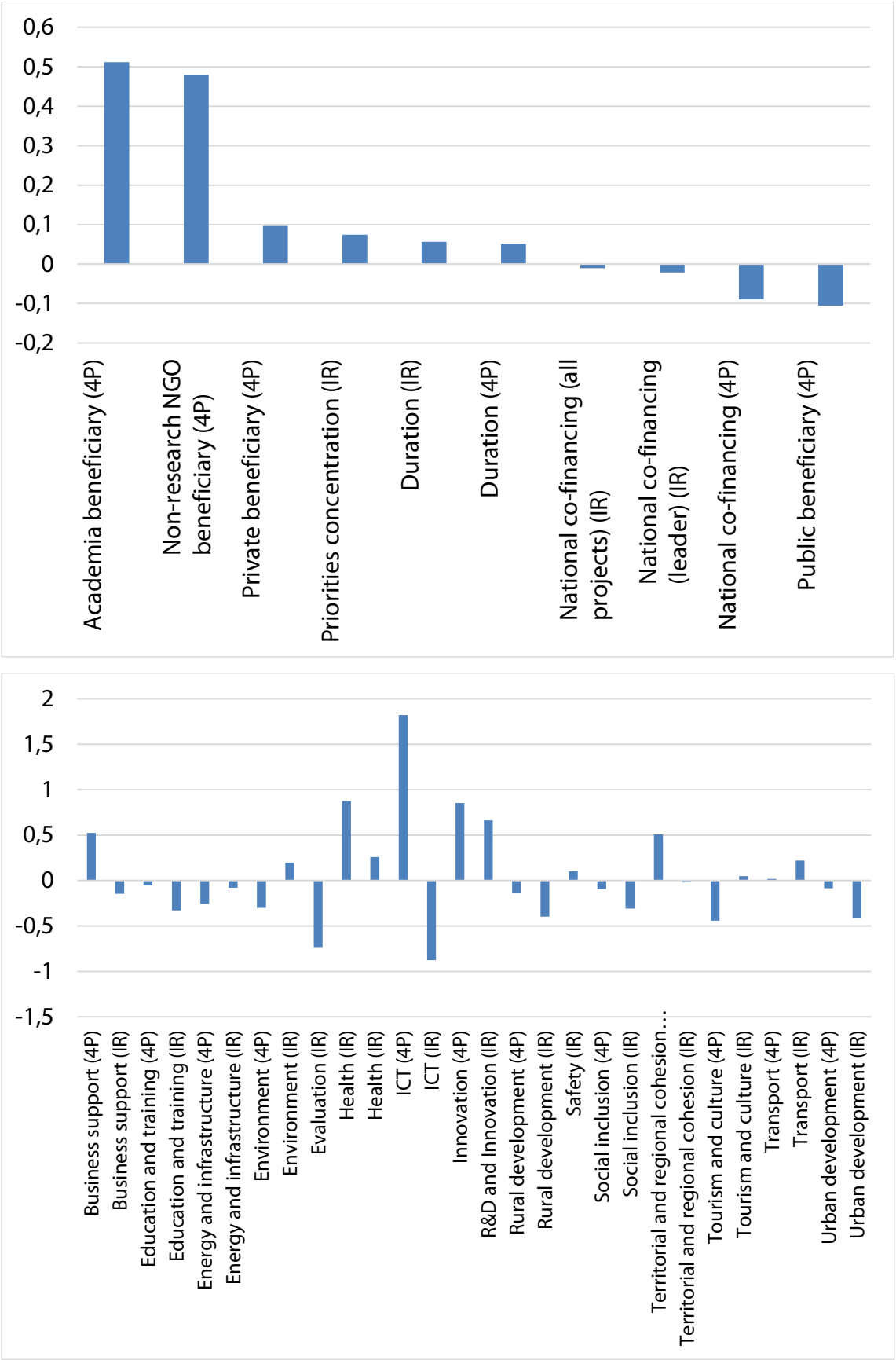
While the correlation analysis involving all EU NUTS-2 regions (with the exception of Greece) has led to several interesting observations, it is useful to complement our analysis by focusing on the differences between the best and worst performers (in terms of unexplained economic growth) from each country. The association between project characteristics and unexplained economic growth could be stronger for the best and the worst performers, but less so for those regions which are in the middle of the growth distribution. Country-specific characteristics could also play a role. Therefore, in this section, we calculate the differences in terms of the project characteristics of the best and worst performing regions for each country, and then average these country-specific differences across the EU. We considered only those EU countries that have at least four NUTS-2 regions and regarded the best performers as those in the top quartile of regions and the worst performers as those in the bottom quartile of regions, in terms of unexplained economic growth (Table 1).

Figure 9: Differences in project characteristics between the first and the last quartiles of regions by country concerning unexplained economic growth (sample without Greece)




0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
CF per capita (2007-2015)
ESF per capita (2007-2015)
ERDF per capita (2007-2015)
EAFRD per capita (2007-2015)


0,6
0,5
0,4
0,3
0,2
0,1
0
-0,1
-0,2
Academia beneficiary (4P)
Non-research NGO beneficiary (4P)
Private beneficiary (4P)
Priorities concentration (IR)
Duration (IR)
Duration (4P)
National co-financing (all projects) (IR)
National co-financing (leader) (IR)
National co-financing (4P)
Public beneficiary (4P)



Note: 4P = four projects database; IR = interregional database.

Source: Bruegel

Figure 9 shows the average difference between each country's first and last quartiles with respect to a series of characteristics related to cohesion policy projects and funds[21]. Since we calculated the differences between the best and worst economic performers *within* each country, instead of *between countries*, the idiosyncratic country-specific factors are eliminated.

In principle, these results could be at odds with the correlations that include all regions, as reported in section 3.4, because they only refer to less than half of the total sample[22] and, by design, do not consider the dynamics within the middle of the distribution. However, in practice our results are very much in line with the simple correlation analysis, suggesting the robustness of our results.

The most robust characteristics suggest that the best performing regions have, on average, projects with:

(i) longer durations,
(ii) a greater concentration of priorities (as reflected in a higher Theil index we calculated),
(iii) more inter-regional focus,
(iv) a higher proportion of non-research NGOs or academic or private sector entities among the beneficiary entities,
(v) a higher percentage of the budget devoted to transport-related projects,
(vi) a higher percentage of the budget devoted to innovation,
(vii) a higher share of funding from the Cohesion Fund.

Worst performing regions, on the other hand, tend have (beyond the opposite characteristics which are listed for the best performing regions):

(i) a higher share of national co-financing,
(ii) a higher proportion of public-sector entities among the beneficiary entities,
(iii) a higher share of funding from ESF and ERDF and EAFRD,
(iv) a higher share of social inclusion,
(v) a higher share of education and training,
(vi) a higher share of urban development,
(vii) a higher share of energy and infrastructure.

[21] We do not include the share of national vs. regional/local management of projects in this analysis, because in several countries (e.g. Belgium, Czech Republic, France, Germany, Hungary, Netherlands and Portugal) there is very little within-country variability in this indicator. The exclusion of these countries from the analysis, along with the exclusion of those countries that have less than four NUTS-2 regions, eliminates most of the observations.
[22] Those countries that are excluded have fewer than four NUTS-2 regions, plus the middle 50 percent of regions are not considered for countries with four or more regions.

4. INSIGHTS FROM INTERVIEWS

KEY FINDINGS

- Cohesion policy is assessed to be the most evaluated of all EU policies, and to bring European value added.
- In some countries, local stakeholders have different attitudes to cohesion and national funds, which sometimes lead to less careful management of EU funds.
- The Performance Framework is found to bring an additional layer of administrative burden without a clear connection to results and the quality of the intervention.
- Beyond the crucial role of administrative capacity and institutional quality, there are no clear-cut characteristics that contribute to the success of cohesion programmes.
- Various suggestions were made on how to improve cohesion policy in the next 2021-2027 MFF, including a stronger focus on addressing the underlying problems, more strategic planning, simplification, stricter control when the corruption risk is high, synergies with other EU and national programmes, more cross-region and cross-border projects and a stronger focus on fewer European goals in the case of more-developed regions.

To shed light on various aspects of cohesion policy design, implementation, effectiveness and desirable reforms that we cannot analyse by using data, either because of data unavailability or of their qualitative nature, we interviewed a number of key stakeholders.

In particular, from the European Commission we interviewed:

- Mariana Hristcheva, Head of Unit, Evaluation and European Semester, DG REGIO, and her colleagues, Daria Gismondi and John Walsh.

From national authorities we interviewed:

- Richard Brooš, Third Secretary, Regional Policy and Coordination of Funds, the Permanent Representation of the Slovak Republic to the European Union;
- Paolo Fischetti, Head of Unit, Ministry of Economy and Finance, General Accounting Department, General Inspectorate for Financial Relationships with the EU, Italy;
- Radomir Matczak, Director, Department for Regional and Spatial Development, Office of the Marshal of the Pomorskie Region, Poland;
- María Muñoz, Deputy Director, Programming and Evaluation Unit, General Directorate of European Funds, Ministry of Finance, Spain;
- Sip Oegema, Head of Unit, Strategy, EU programmes, Analysis, Directorate-General for Enterprise and Innovation, Ministry of Economic Affairs and Climate Policy, the Netherlands; and
- Ulrike Schreckenberger, National Coordination of EU Cohesion and Structural Policy/ERDF, German Federal Ministry for Economic Affairs and Energy, Germany.

We also interviewed a number of independent experts:

- Iain Begg, Professorial Research Fellow, European Institute, London School of Economics and Political Science, United Kingdom;
- Klaudijus Maniokas, Chairman of the Board, European Social, Legal, and Economic Projects (ESTEP) and associate professor at the Institute of International Relations and Political Science, Vilnius University, Lithuania;
- Urmas Varblane, Professor of International Business, University of Tartu, Estonia; and
- András Vértes, Chairman, GKI Economic Research, Hungary.

The ten home countries of these national interviewees provide a diverse set of countries including less and more-developed regions.

- One additional interviewee wished to stay anonymous.

We are grateful to these people for sharing their thoughts with us and allowing us to publish their names. We do not attribute specific answers to individuals or their institutions.

A summary of these interviews can be structured in ten parts.

1. Evaluation

Most interviewees emphasised that cohesion policy is the most evaluated of all EU policies; it is subject to scrutiny by various European institutions, national assessments, independent evaluations and a vast academic literature. The policy is also constantly improved to reflect the conclusions of evaluations. Other EU policies are subject to much less scrutiny. Two particular policies were highlighted by some national and independent interviewees: the European Common Agricultural Policy (CAP) is subject to significantly less evaluation, and the European Fund for Strategic Investments (EFSI – the so-called Juncker plan), for which an increase is planned in the next MFF, based mostly on the success of money spent, not on a thorough analysis of its usefulness.

2. European value added

Most interviewees underlined the positive EU value added of cohesion policy, even though there were some very critical remarks from some independent experts. Especially in countries dominated by less developed regions, cohesion policy is thought to be a major driver of economic and social development and an important instrument in the fight against climate change. Without EU support, some projects would not have happened or would have been postponed, thus harming economic convergence, the environment or e.g. disabled people seeking to return to the labour market.

Views were more mixed about the usefulness for more developed regions, though interviewees from countries dominated by such regions underlined various forms of value added for their own regions. In particular, the benefits of cross-region projects involving more than one country were emphasised, as was focusing attention on EU goals, which would receive less attention in the absence of EU funding. However, some interviewees said that the amount of money received by richer regions is small; national budgets of countries with richer regions would be able to provide that money easily.

At a more general level, the link between cohesion policy and the EU's single market was also emphasised. Investment by cohesion policy and convergence of rules and standards go hand in hand – both help to improve the functioning of the single market. Another important element of European added value is the contribution to EU-priorities, such as smart, social and green goals.

On the flexibility of cohesion policy, member states, especially those facing financing pressures, were particularly appreciative of the funds during the global and European financial and economic crises that intensified after 2008. National co-financing rates were reduced and some projects were entirely EU-funded, providing a lifeline.

3. Different attitudes to EU and national funds

Some independent experts said that EU money is viewed differently to national money by public authorities and by private beneficiaries, and is not always spent with equal care. One expert noted that since direct transfers to farmers under the Common Agricultural Policy are widely viewed as a wasteful use of EU money, this sometimes encourages a reckless use of other EU funds, including cohesion funds.

The view was also expressed by experts knowledgeable about high corruption-risk countries that the likelihood of artificially high pricing is greater with EU-funded programmes than with nationally funded programmes. There should be very strict analysis of whether prices correspond to market prices, while a high level of concentration of public procurement winners should be avoided.

In relation to private beneficiaries, a distortion could emerge if obtaining EU funds becomes a central element of business plans.

Another view, expressed by a national expert from a country with a very prudent finance ministry, is that there is a strict division between EU funds and national annual budgets, which are detached from each other.

A few experts noted that the local EU funding unit within the main ministry responsible for the distribution of funds is too powerful, which might not always result in the optimal allocation of EU funds.

4. The Performance Framework

Most national and independent interviewees were very critical of the Performance Framework. While most acknowledged its good intentions – focusing attention on strategic tasks, enhancing result orientation and fostering the delivery of projects on time – major criticisms were raised.

Objectives and targets have to be justified by national authorities and it was highlighted that documents providing justifications had significantly variable quality and were not comparable across proposals. The methodologies for the preparation of such documents have not been discussed and compared. Even though there was informal and formal coordination between managing authorities and the European Commission, in a number of cases the Commission had little ground to argue with member states. While, according to Annex II to Regulation (EU) No 1303/2013, milestones and targets shall be realistic and achievable, some interviewees noted that targets were set at low levels to help easy achievement. One of the interviewees noted that "*everyone was able to adapt to the Performance*

Framework". Since the performance review assessing the achievements of the milestones is expected to be released in mid-2019, it will be interesting to see the share of the programmes and priorities that have achieved their milestones.

The content of several indicators – output and financial indicators – is not directly related to performance and results. For instance, counting the length of roads built is more like counting the money spent and is an indicator of implementation, but does not guarantee that the ultimate goals for which the road was proposed in the first place have been achieved. Constructing new school buildings and then counting their number is easy, but this might not solve the educational problems of a region, if, for example, the main problem is the lack of qualified teachers. In this regard, Members of the European Parliament (MEPs) are criticised as being more interested in the speed of spending than in the results in terms of addressing the real underlying problems.

Several interviewees noted that the number of indicators is excessive and plays too strong a role in the process without giving a clear picture of the whole policy. It is essential to assess and evaluate cohesion projects, but different methods are needed and the use of indicators is just one of them.

Implementation of the performance framework was generally found to create an extra layer of rules on top of existing rules in order to speed up spending. However, it has not transformed the earlier compliance-based logic (which involves all checks, audits, management verification) to a results-orientated approach as was its aim. Most people just produce indicators as a last exercise. It was noted that the existing 'N+2 or N+3' rule[23] already created pressure to spend the money. It was therefore not helpful to put 6% of the resources into the programme performance reserve, with this reserve allocated away from priorities that have not achieved their milestones. This has created additional pressure to spend the money without due consideration of the quality of the spending. Instead, it was recommended that the Performance Framework should control the quality of investment, with attention focused on addressing the real underlying problems rather than on the speed of spending.

However, some interviewees noted that there has to be a certain amount of pressure on national authorities, otherwise implementation could be severely delayed. Because of shared management and partnership agreements, (which most interviewees found very useful), implementation of cohesion projects crucially depends on national authorities and European institutions can do little to speed up the process.

5. Factors determining the success of cohesion policy

With the exception of a few common factors, such as the importance of high-level administrative capacity and institutional quality, interviewees listed rather diverse factors that might contribute to success. Additionally, several interviewees emphasised that regions, programmes and projects differ so much that it is not possible to provide a clear list of success factors. Research points in numerous

[23] Member States Cohesion Policy allocations are divided into annual amounts which must be spent within two or three years, depending on the country. This rule is known as the 'N+2 or N+3' rule, with N being the start year when the money is allocated. Any of that annual amount which is not claimed by the Member State within that period is automatically deducted from their allocation and goes back into the overall EU budget. See at: http://europa.eu/rapid/press-release_IP-13-446_en.htm

directions and there are both very successful and unsuccessful projects across sectors, financing arrangements, etc.

The only unanimous view was to underline the importance of institutional quality and highly efficient administrative capacity. The interaction between local, regional and national authorities is also found to be important. In this regard, some interviewees noted that it takes managing authorities, and also beneficiaries, a long time to develop the skills needed to effectively design and manage programmes and projects. Technical assistance is thus vital in regions characterised by weaker institutional quality.

Low implementation rates partly result from low levels of administrative capacity of the experts involved in implementation. In some countries, the main bottlenecks leading to long delays are public procurement and state aid policies.

It was also noted that while EU regulations are burdensome, in some countries national implementation of EU regulations is sometimes too strict and involves extra administrative requirements, hindering effective project implementation.

On the use of grants versus financial instruments, most interviewees emphasised that their usefulness depends on scheme, sector and other circumstances. There are good and bad practices with both. An interviewee highlighted that financial instruments work very well for supporting small and medium size enterprises (SMEs), but were less useful for urban projects, because projects should be profitable for the use of financial instruments, which was the case with SME projects, but was more difficult with urban projects.

Some interviewees emphasised the importance of strategic thinking for success. Another issue raised was whether EU programmes are embodied into national policies, or rather implemented as a separate policy. Others emphasised that success is linked to the broader environment of government intervention.

There were no clear views about whether the sector of intervention matters, though one interviewee highlighted that investment in infrastructure is easier and leads to more tangible results than investment in people, research and institutions.

There was no clear view about private sector involvement, though a few interviewees took the view that private sector involvement increases the probability of project success.

The level of development might matter for certain type of programmes. For example, less developed and transition regions face difficulties in absorbing EU funds in sectors such as R&D, innovation, ICT or the low-carbon economy. This is mainly because of their economic and productive structure as lagging regions; they tend to have weaker innovation systems and less developed business sectors.

It was also noted that thematic concentration has imposed uniform sectoral priorities on the regions, without taking into account their real development needs. Therefore, this can adversely affect the effectiveness of EU funds.

6. The role of national co-financing

Many experts considered national co-financing of EU-funded projects irrelevant for the eventual success of projects, though some of these experts highlighted that more national co-financing can lead

to higher ownership of the programmes, which might help. Furthermore, the national co-financing rate might influence the pace of implementation, as public administrations might face budgetary constraints (to meet deficit objectives). Nevertheless, beyond timing, this factor should not influence the results.

However, when artificially high purchase prices are more likely with EU-funded projects than with nationally funded projects, an increase in national co-financing (at least to one half) would be welcome.

7. Thematic areas

It was widely emphasised that problems differ from member state to member state and from region to region. Therefore, a uniform requirement for the use of EU funds, such as the overwhelming role of innovation, would not serve the interests of all regions. Some interviewees, who had deeper knowledge of less developed regions, emphasised the key strategic importance of education, healthcare systems, energy modernisation and transport infrastructure (e.g. lower-level road and rail modernisation). Some interviewees noted that such basic problems hardly enter the country-specific recommendations of the European Semester; therefore, linking EU funds to European Semester recommendations would be unwise.

On the other hand, some representatives of more developed regions emphasised the overriding importance of innovation, which was less prominently mentioned by representatives of member states dominated by less-developed regions.

8. Synergies with other EU and national policies having a regional character

It was expressed that the use of cohesion/regional funds and other EU funds with territorial impact can broaden their effects and synergies on the ground, if appropriate coordination mechanisms and arrangements are set up and agreed on by the implementing bodies. The design of the implementation structures at the beginning of the programming period, therefore, plays a key role. Coordination mechanisms are also crucial to avoid overlaps and duplication of efforts.

Despite this need, most interviewees took the view that cohesion policy is hardly coordinated with other EU and national policies with a regional focus. For example, an obvious candidate would be rural development under CAP pillar 2, but very limited synergies have so far been explored. On the positive side, one interviewee mentioned the Trans-European Transport Network, which is thought have a positive synergy with cohesion policy.

On national funds, some interviewees took the view that EU cohesion funding replaces national funding in countries that receive large amounts of EU funding; therefore, funding of certain sectors can become overly reliant on EU funding. This will create a challenge when EU funding declines.

9. Need for strategic focus

Several interviewees highlighted the importance of focusing on strategic issues. Frequent changes of priority might lead to loss of effectiveness. For example, when a new government is elected, phasing out existing programmes and launching new ones might hinder the effectiveness of both. Programmes and projects should look beyond the immediate priorities of the region and long-term strategies should be considered.

10. Future reform of cohesion policy

Finally, we asked the opinion of interviewees about the desirable direction of cohesion policy reform and their opinions on the European Commission's 2018 proposal. Responses to these questions were rather diverse, also reflecting different opinions expressed in public debates.

- Results orientation: based on the critical remarks about the Performance Framework we summarised earlier, several interviewees suggested that it should be results-oriented, and not indicator-oriented. It is necessary to improve the quality of the interventions. Mechanisms for evaluation of the impact of intervention have to be reinforced. An *ex-ante* evaluation of the real needs and objectives should not be only a formal commitment to comply with an obligation. The Performance Framework should not be used as a tool to create additional time pressure, but instead should focus on addressing the real underlying problems. The 'N+2 or N+3' rule is sufficient to create pressure to spend the money.
- Methodology of target setting: it would be important to define the basic method to be used for the reports providing justifications and there should be attempts to compare methodologies when they are different. The use of key performance indicators was also suggested. It was also noted that, for the current 2014-2020 MFF, guidelines were made available too late, and it would be very important to have various rules and guidelines ready by the beginning of the next MFF.
- Simplification: several interviewees highlighted simplification as the most relevant objective to achieve more effective implementation of cohesion policy. Current rules are more oriented to ensure compliance with numerous requirements, including respect for quantitative targets, rather than focusing on the quality and the impact of interventions. Rules are much too burdensome for the beneficiaries of interventions. The legal framework and management and control systems need to be simplified considerably in order to reduce the administrative burden and to facilitate the achievement of the expected results. It was highlighted that compliance with the revised rules must always be guaranteed, in particular to safeguard the principle of sound financial management. Useful elements of simplification would be the wider use of the simplified cost options[24] and financing not linked to costs, but to results[25]. Proportionality in audit activity based on risk analyses is a useful approach in order to reduce the unnecessary burden on beneficiaries and programme authorities and bodies. The various European Commission initiatives for simplification were welcomed, but interviewees

[24] Simplified cost options (SCOs) designate the "the use of flat rate financing, standard scales of unit costs and lump sums" when declaring costs as part of projects, with the European Commission paying out such costs instead of only reimbursing 'real costs'. It is expected that by 2020, SCOs will cover approximately 33percent of the ESF, 2percent of the EAFRD and 4percent of the ERDF-CF budgets. More developed regions make greater use of SCOs than less developed regions. See Brignani and Santin (2018).

[25] Article 125(1) of the Financial regulation applicable to the general budget of the Union allows EU contributions in the form of financing not linked to costs in two alternative cases: either (i) the fulfilment of conditions set out in sector-specific rules or Commission decisions; or (ii) the achievement of results measured by reference to previously set milestones or through performance indicators. See https://publications.europa.eu/en/publication-detail/-/publication/e9488da5-d66f-11e8-9424-01aa75ed71a1/language-en/format-PDF/source-86606884.

expressed some doubts, noting that there were a number of simplification attempts in the past that delivered little.

- Corruption risk: for high corruption-risk countries, very strict analysis of national public procurement practices was recommended, as well as the analysis of whether purchase prices for EU-funded projects correspond to market prices.
- Thematic concentration: different views were expressed. Several interviewees highlighted that it should also become more flexible, so that managing authorities can adapt programmes to their real territorial or sectoral priorities. But an opposite view was also expressed; priorities that are too broad risk dispersed programmes with little impact. At least for more-developed member states, it was recommended that there should be a stronger focus on fewer European goals (as opposed to region-specific goals).
- The number and magnitude of operations and projects: a huge number of small-scale operations is a burden for managing bodies, undermining their effectiveness in terms of meeting general, shared strategic objectives. Dealing with fewer, but significant, projects is easier in terms of administrative management, and offers the prospect of a more effective impact.
- Flexibility and reprogramming: the European Commission's proposal for 2021-2027 involves a more flexible approach: extending the review beyond the quantitative indicators and incorporating considerations that the financial cycle or country-specific recommendations might have on performance. Countries could re-programme the last two years, taking into account implementation, circumstances and European Semester recommendations. The views of several interviewees on general flexibility were diverse (some welcomed this proposal, others expressed disapproval), while the link to European Semester recommendations faced criticism.
- Greater link with the European Semester: several national and independent interviewees expressed major disapproval of this suggestion. It was argued that European Semester recommendations often miss the real problems of countries and their regions. On the other hand, there was some support for some proposals concerning conditionality relating to social and fiscal legislation.
- Partnership principle: several interviewees highlighted that partnerships work well and should be maintained.
- Partnerships between local authorities: it would reduce the administrative burden.
- Synergies with national policies: it was suggested that cohesion policy should be embedded into national policies to improve synergies and effectiveness.
- Synergies between various EU policies: in line with the criticism we summarised earlier, better coordination would be very important. Other ESIF funds, CAP, Horizon 2020 and digital projects were highlighted.
- Cross-region and cross-border projects: EU value added would be greatly enhanced by more emphasis on interregional projects, which would foster EU-wide (as opposed to specific regional) goals between comparable clusters of cities and regions throughout Europe.

- Proposed reduction of the share of overall cohesion spending in total EU spending: some interviewees were very critical about this proposal, arguing that several European regions are less developed and EU support for promoting their economic development is essential. Others argued that new priorities have emerged for the EU and several regions have converged closer to the EU average, which could justify lower cohesion funding.
- Proposed reallocation of Cohesion Fund resources to the ERDF: some interviewees were critical about this idea and see as an attempt to divert cohesion funding away from poorer regions.
- Stability and Growth Pact (SGP): there was a recommendation to separate national co-financing of EU projects from the budgetary indicators considered in the SGP.

5. THE IMPLICATIONS OF OUR RESULTS FOR COHESION POLICY REFORM

KEY FINDINGS

- The overall allocation of EU resources to cohesion policy and other priorities is a political issue and thereby we do not make a recommendation, although we note that continued convergence reduces the need for cohesion funding.
- Within the cohesion envelope, we found growth-enhancing effects only for the Cohesion Fund, and its proposed drastic reduction should thus be assessed, based on a clarification of the importance of economic convergence and other goals, such as social inclusion and the protection of the environment.
- The national co-financing rate should be set on the basis of fiscal constraints, the additionality principle and corruption risk. We welcome the InvestEU initiative, through which a single project can raise financing from financial instruments, grants and private and public funds, thereby tackling financing constraints.
- Our study signals a negative correlation between economic growth and the proportion of projects under local entities' management. A way of reconciling this finding with the greater involvement of local entities would be to couple locally led demand for projects, driven by a more accurate knowledge of local needs and deficiencies, with higher-level allocation, oversight and management.
- Thematic concentration along with fewer EU goals is well justified in more developed regions, but not in less developed regions. Irrespective of the degree of thematic concentration, individual projects should be focused and have longer durations, in line with long-term strategic planning. Such an approach does not necessitate a high level of flexibility of cohesion policy.
- A strengthened link with the European Semester should be avoided.
- Interregional projects should be further encouraged.
- Result orientation and simplification should be major aims of the reform, as should increased transparency over data and indicators about the design and implementation of projects.

Cohesion policy, the primary EU tool for promoting economic convergence, is set to be reformed. The European Commission has proposed a revised framework for cohesion (and regional) policy in the next MFF for the seven-year period from 2021 until 2027. The proposal is subject to intense debate. We wish to contribute to this debate based on our literature review, empirical research and interviews.

The cohesion policy literature is inconclusive about the impact of the policy: some studies find positive long-term impacts, others positive but only short-term impacts, while others find no impact at all or even negative impacts. Such diversity relates to major econometric and data problems that affect the analysis. Various institutional, structural and political factors influence the impact of the policy, while other (EU and national) policies interact with cohesion policy. Many of these factors are not observable or are unmeasurable, implying that a researcher cannot control them and thereby must leave them out from empirical work. However, leaving out important variables from an empirical analysis leads to the

so-called omitted variable bias, which causes biased estimates of the parameters of the included variables. Moreover, the simultaneous determination of cohesion policy and economic/social variables can lead to further biases.

We, therefore, did not use earlier methods from the literature, but studied the possible impact of cohesion project characteristics in a novel way. We identified the NUTS-2 regions that performed best and worst in terms of GDP growth, conditional on a wide range of regional factors, and then studied if various project characteristics differ between the best and the worst growth performers. While we cannot claim causality, i.e. that certain cohesion project characteristics explain faster growth, a systematic comparison of best and worst performing regions in terms of project characteristics can shed light on useful regularities.

Certainly, GDP growth is not the only indicator of a programme's success, but it remains the most important objective of cohesion policy, even if there are a number of other objectives, including social inclusion and environment protection. Unsurprisingly, we found that cohesion projects focusing more on the environment and social inclusion are associated with weaker economic growth.

We complemented our literature review and empirical calculations with interviews with various stakeholders. Some of our empirical findings coincide with the views of interviewees, but interviewees expressed many other ideas, which are qualitative in nature and cannot be measured.

In terms of cohesion policy reform, a first issue is the total amount of EU financial resources allocated to cohesion policy and the distribution of these resources across the funds. The European Commission did not present a proper comparison of current and proposed future spending on cohesion or on agriculture. Therefore, a careful comparison was made by Darvas and Moës (2018). EU agricultural spending also includes a regional fund, the European Agricultural Fund for Rural Development (EAFRD) that we included in our study and, therefore, we looked at the proposed allocation of EU resources to agriculture (Table 11).

Table 11: Cohesion and agricultural commitments in the current and the proposed next MFF

	Current prices				2018 prices**			
	Col. 1: 2014-2020 MFF	Col. 2: 2014-2020 MFF excl. UK*	Col. 3: 2021-2027 MFF	Col. 4: Change (col. 3/col. 2), %	Col. 5: 2014-2020 MFF	Col. 6: 2014-2020 MFF excl. UK*	Col. 7: 2021-2027 MFF	Col. 8: Change (col. 7/col. 6), %
Cohesion	**366**	**354**	**374**	**6%**	**369**	**358**	**332**	**-7%**
--o.w. ERDF	196	189	226	20%	198	190	201	5%
--o.w. ESF+	95	91	101	11%	96	92	90	-3%
--o.w. CF	75	75	47	-37%	75	75	41	-45%
CAP	**408**	**379**	**365**	**-4%**	**413**	**384**	**324**	**-15%**
--o.w. EAGF	313	289	286	-1%	316	292	254	-13%
--o.w EAFRD	96	91	79	-13%	97	91	70	-23%

Notes: ERDF: European Regional Development Fund; ESF+: European Social Fund+; CF: Cohesion Fund; CAP: Common Agricultural Policy; EAGF: European Agricultural Guarantee Fund; EAFRD: European Agricultural Fund for Rural Development. For 2021-2027, ESF+ merges the former ESF, the Youth Employment Initiative, the Fund for European Aid to the Most Deprived, the Employment and Social Innovation programme and the Health programme. For consistency, we therefore merged these instruments for 2014-2020 as well. * We computed these numbers by subtracting the UK's share of pre-allocations per programme (computed from http://ec.europa.eu/budget/mff/preallocations/index_en.cfm). For Health and ESI programmes, we approximated the UK share with the UK share of Total Cohesion Policy. ** For col. 5 and 6, we converted each year's current prices into 2018 prices using the GDP deflator for EU excl. UK from DG ECFIN's Ameco database (May 2018). For col. 7, we deflated the annual current prices proposed values by the IMF inflation forecast (which is essentially 2%).

Sources: Darvas and Moës (2018), based on various European Commission documents.

Table 11 shows that overall, cohesion spending commitments are planned to be increased by 6%, after excluding commitments to be spent in the United Kingdom from the current 2014-2020 MFF. However, inflation erodes the real value, leading to a reduction of 7% in real terms (if inflation is 2% per year, as the MFF calculations assume and the IMF forecasts). Since EU27 GDP is expected to grow from 2014-2020 to 2021-2027 in real terms too, the proposed reduction of cohesion commitments as a share of GDP is greater than the reduction in real terms.

The proposed realignment between the three main funds of cohesion policy is also notable. While a reduction of 37% is proposed for the Cohesion Fund (CF), the European Regional Development Fund (ERDF) would be increased by 20% and the European Social Fund+(ESF+) by 11%. The regional arm of CAP, the European Agricultural Fund for Rural Development (EAFRD), would be reduced by 13%.

Our research does not have implications for the total allocations to various cohesion funds. We regard this allocation as a political issue, which should be based on the assessment of various priorities and the availability of EU financial resources after the United Kingdom leaves the EU. However, we note that with continued convergence, the need for cohesion policy is gradually reduced. According to the calculations of Darvas and Moës (2018), 29.2% of EU27 citizens (not considering the UK) lived in less developed regions in 2013, that is, in regions with GDP per capita below 75% of the EU27 average. This share is expected to drop to 25.2% by 2020 and 22.3% by 2027.

Nevertheless, our research has implications for the distribution of resources among the various funds used for cohesion policy. We found that among four funds, only the CF is associated with better growth performance – the fund that the Commission proposes to reduce the most. A possible explanation for the lack of statistically significant positive correlation for the other funds could be their more diverse goals, including environmental protection and social inclusion, which might not immediately lead to faster economic growth. Therefore, the importance of economic convergence and other goals should be contrasted to each other: if fostering economic convergence remains an important goal, then the relative funding of programmes, which are typically funded by the CF, should not be reduced. This could be achieved by not reducing the relative size of CF, or increasing the CF-type programmes in the portfolios of the other funds.

A related question is the selection of the indicators to be used when allocating funds. The reform under scrutiny slightly reduces the scope of the so-called Berlin formula, which distinguishes between less developed, transition and more developed regions based on each region's GDP relative to the EU average, because it aims to integrate other factors, such as youth unemployment, climate change, education levels and the reception of migrants (although the envisaged changes are more of a symbolic nature)[26]. As this might be legitimate, in order to give a more nuanced and accurate representation of regional disparities, it is worth emphasising that our analysis consistently reports the substantial effectiveness of the CF in driving economic convergence, which is targeted exclusively to countries with lower GDP per capita. From this point of view, the discussion of the proposed change in the allocation key leads again to the political question of setting priorities: a clearer and narrower objective of economic convergence would suggest the role of GDP per capita in the allocations should not be reduced, but if other objectives, such as tackling climate change and social problems, are assessed to be more prominent, then a change in the allocation method is justified.

Another important aspect of funding is the national co-financing rate, namely the rate of contribution to projects' budgets from the national authority (be it the country, the region or the village). Average national co-financing rates were very low, typically below 20% in most central European and southern Italian regions, while in more advanced regions, it exceeded 50% (Figure 5). The Commission plans to increase the minimum national co-financing rate to 30 percent for less developed regions, outermost regions, Cohesion Fund projects and interregional projects, 45 percent for transition regions and to 60

[26] Currently, allocations are set based on 'GDP' (86percent) and 'labour market, education, demographics' (14percent). Under the new rules, climate (1percent), migration (3percent) and more weight given to 'labour market, education, demographics' (15percent) would reduce the relative importance of 'GDP' to 81 percent.

percent for developed regions, in order to improve the sense of ownership of projects at a local level and to incentivise quality spending. Our interviewees shared the view that increased national co-financing could increase ownership.

Increased national co-financing could impact the total volume of cohesion projects in the opposite way in fiscally constrained and non-constrained countries. In countries that do not face fiscal constraints, higher national co-financing might even lead to an increase in cohesion projects, because for a given amount of EU funding more national funding is added. On the other hand, in fiscally-constrained countries or regions, increased national co-financing would lead to fewer cohesion projects, because it reduces the fiscal capacity to spend on other issues, including growth-enhancing projects. Most likely this latter influence dominated our sample period (partly because of the global and European financial crises) and explains our empirical finding, which shows that higher national co-financing is associated with lower economic growth. This reasoning highlights the importance of national fiscal space considerations in setting the national co-financing rate. While several countries faced fiscal constraints during the recent economic crisis, if economic growth continues as currently predicted and interest rates remain low, fewer countries might face fiscal constraints in the 2021-2027 period than in the period after the 2008 global crisis, in which case some increase in the national co-financing rate would be justified.

Another consideration when setting the co-financing rate relates to the ex-post analysis of the additionality of EU funds. The European Parliament and Council in 2013 reaffirmed the additionality principle for cohesion policy[27]: "*In order to ensure a genuine economic impact, support from the Funds should not replace public or equivalent structural expenditure by Member States*". The idea behind this principle is that cohesion policy should complement, rather than substitute, national funding. However, it is questionable whether this principle has been actually obeyed. For example, Varblane (2016) concluded that EU funds replaced the Baltic countries' own funding of higher education research, thereby violating the additionality principle. We recommend a comprehensive analysis of whether this principle has been complied with for all countries and sectors using available data from recent years. If the analysis finds a widespread violation of this principle, then a higher national co-financing rate would be justified in the next MFF, in order to direct some of the national resources back to the funding of regional and cohesion projects.

A further aspect is corruption: when the risk of corruption or the less-careful use of EU funds is high, we see a clear rationale for increased national co-financing, echoing the recommendation of some of our interviewees.

Reduced involvement of EU money, however, might be alleviated through an increase in the use of financial instruments, as envisaged in the Commission's proposal. More specifically, member states will be able, on a voluntary basis, to move (part of) their funds under shared management to an EU-wide

[27] In Regulation (EU) No 1303/2013. See https://ec.europa.eu/regional_policy/sources/docgener/guides/blue_book/blueguide_en.pdf .

instrument called InvestEU, with access to EU guarantees. This might incentivise the mobilisation of private capital. Our findings show that the proportion of private entities and non-research NGOs among the beneficiaries is significantly correlated with economic growth across our sample. An increase in private funding of cohesion projects could therefore reduce the gap left by a lower EU contribution. Under the InvestEU scheme, a single project could collect financing from financial instruments, grants and private and public funds, marking a clear attempt to tackle financing constraints. A counter argument, however, is that the private sector's interest in cohesion projects can be variable and there are certain types of projects to which the private sector might not want to contribute financially.

Another way of combining the beneficial effects of EU funding with the most effective incentives for local entities is to make the EU co-funding conditional on past use of funds, or so-called performance-based budgeting. On the negative side, this could deprive regions that potentially need cohesion funds the most (ineffective use or absorption of funds can be caused by poor local governance) of useful help, thereby further distancing them from their most advanced peers. On the other hand, this mechanism could feed a positive incentive dynamic whereby best-performing regions are rewarded with lower national co-financing requirements. At any rate, as emerged from our interviews, effective deployment of EU finances critically depends on the administrative capacity of the managing authorities. This is all the more relevant as the Commission's reform suggests adopting a *"locally led perspective"*, with greater reliance on local authorities for the management of funds.

Our study, however, signals a negative correlation between economic growth and the proportion of projects under local entities' management. As a consequence, where administrative capacity is lacking, building proper expertise and structures should be a top priority. An alternative way of reconciling our findings with the greater involvement of regions and provinces would be to couple locally-led demand for projects, driven by more accurate knowledge of local needs and deficiencies, with higher-level allocation, oversight and management.

A focus on key investment priorities as proposed is arguably necessary for fostering the achievements of EU-wide goals. However, it should be ensured that concentration of priorities does not translate into unnecessary limitations on the type of eligible project. Our interviewees suggested that less developed regions have very different needs to more developed regions. In the latter case, country budgets could easily replace EU funding with national funding[28], so the main reasons for continued provision of funding to more developed regions are partly political (giving every region some EU money so that local bodies sense some direct benefits from the EU budget) and partly strategic (EU money could support the achievements of EU goals). Therefore, in these more developed regions, thematic concentration along with the setting of fewer EU goals would be well justified. However, in less developed regions, thematic concentration might not coincide with local needs, reducing the usefulness of cohesion policy. Diversified strategies in less developed regions can help regions uncover new, unexplored growth paths, which fit with their advantages. We therefore call for varied thematic

[28] See Table 4 showing that the combined ERDF and ESF commitments to more-developed regions amount to a mere 0.07 percent of the GDP of these regions.

concentration, depending on the level of development of the region: a high level of concentration in more developed regions and limited concentration in less developed regions. On a related issue, it is welcome that, under the Commission's proposal, *ex-ante* conditionality will continue, though less stringently as 'enabling conditions', to fully consider regional specificities.

Irrespective of the degree of thematic concentration, our results clearly show that at the programme level, more concentration of priorities is associated with better growth performance. That is, even if objectives are diversified for less developed regions, each individual programme should be focused on few objectives. Another related finding from our empirical research is that duration is also associated with better growth performance, which sounds intuitive. Longer-term projects probably involve more planning and greater implementation efforts. Both of these results are consistent with the importance of strategic focus in cohesion policy. Setting up long-term strategies, and sticking to them in implementation, seems to be important factors in the usefulness and effectiveness of cohesion policy. For these reasons, we are less enthusiastic about the various forms of flexibility that are included in the Commission's proposal, including moving resources between priorities or even between funds. When programmes and projects are strategic and aim to tackle the fundamental problems of a region, they hardly need flexibility in terms of reallocation. Similarly, while we regard the mid-term review as very important, we do not advocate the proposed reprogramming for the last two years of the MFF. When programmes and projects are strategic, they might need changes to adapt to circumstances, but not a fundamental reprogramming. The possibility of reprogramming increases uncertainty and might undermine implementation in the first five years of the MFF. Flexibility in the overall EU budget can be useful, in order to respond to major unexpected shocks (such as the 2015 immigration crisis), but we see much more limited need for flexibility in the special case of cohesion spending, which should focus on long-term strategic priorities.

The new proposal highlights the importance of further supporting interregional innovation projects. One of the most robust findings of our study is the great potential of interregional projects to unlock growth. In this respect, they appear to be more effective than the average ERDF project. However, care must be taken to avoid divergent tendencies that can arise if more advanced regions have better conditions to engage in large-scale cooperation. Capacity building again becomes crucial, in which fostering the cooperation with each other of more and less-developed regions could also play a role.

The strengthened link with the European Semester in the new proposal aims to better integrate economic-policy coordination in the EU with the use of EU funds. However, several interviewees said in their view the European Semester's country-specific recommendations (CSRs) do not coincide with the real needs of their countries. Moreover, there are also regional differences within countries, and CSRs rarely aim to tackle region-specific problems. Research on the implementation of the CSRs finds very low implementation rates, which have even deteriorated recently (Darvas and Leandro 2015; Darvas and Leandro 2016; Efstathiou and Wolff, 2018). While views about the reasons for low and deteriorating CSR implementation rates can differ, they likely reflect the lack of popular and political support for the proposed reforms. Tighter linking of EU funds and the European Semester risks the

politicisation of cohesion policy and the erosion of support for the EU and, therefore, we do not recommend it.

Simplification is an important element of the reform proposal. This aim was supported by our interviewees. Shortening and clarifying the rulebook and the elimination of some procedures altogether are welcome. Simplification should come with an overarching aim of focusing on results (that is, whether the actual problems for which an intervention was designed have been tackled) instead of focusing on bureaucratic compliance and meeting output indicators (such as the length of the roads built). Our interviewees highlighted that the Performance Framework was ineffective in fostering greater results orientation. We also see great potential when the focus is on results in the wider use of the simplified cost option and financing not related to costs. Such a shift in focus could also alleviate problems associated with possible corruption and improper use of the funds, since beneficiaries will have to demonstrate that they have achieved results, instead of just declaring costs, which (in case of corruption or mismanagement) could be much higher than reasonable costs under sound management.

Finally, we call for increased transparency of data and indicators about the design and implementation of projects, which are planned to be reported every two months and publicly uploaded to the Cohesion Open Data Platform. One of the most challenging parts of our research concerned the collection of vast and reliable datasets. A more detailed and regularly updated dataset can only improve the room for democratic and scientific scrutiny of cohesion policy, ultimately benefitting all stakeholders.

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ANNEX A1 LITERATURE SUMMARY

Table 12: Summary of selected empirical research on the impact of cohesion policy

PUBLICATION	IMPACT FOUND	METHOD USED	CONCLUSION
Boldrin and Canova (2001): Inequality and convergence in Europe's regions: reconsidering European regional policies	No convergence nor divergence found. Exception made for a couple of miracles and a few disasters; most regions are growing at a fairly uniform rate, irrespective of their initial conditions.	Kolmogorov-Smirnov test	If the true objective of regional economic policies is to foster economic growth in the poorer regions and promote convergence, then the policies adopted by the Community are not justifiable in the light of current economic knowledge and hard statistical evidence.
Beugelsdijk and Eijffinger (2005): The effectiveness of structural policy in the European Union: An empirical analysis for the EU-15 in 1995–2001.	Positive	GMM (Gaussian Mixture Model)	Structural funds may indeed have had a positive impact, and poorer countries (like Greece) seem to have caught up with the richer countries.
Ezcurra and Rapún (2006): Manuel Regional Disparities and National Development Revisited: The Case of Western Europe	Positive beyond a threshold of GDP per capita	Semi-parametric technique based on the kernel regression estimator implemented by Robinson (1988).	Public policies aimed at promoting overall growth in the economy as a whole will contribute to neither increasing nor decreasing territorial imbalances within the various countries considered.
Lopez-Rodriguez and Faina (2006): Objective 1 regions versus non-objective 1 regions. What does the Theil Index tell us?	Does not mention precisely EUCP. Convergence after 1987.	Generalized entropy index such as the Theil index	The results show that between 1982 and 1987 the income disparities between objective 1 regions and non-objective 1 regions have increased, while from 1987 onwards objective 1 regions catch up with the non-objective 1 regions.
Ederveen and al (2006): Fertile soil for structural funds? A panel data analysis of the conditional effectiveness of	None	Three evaluation methods are used: model simulation, case studies and econometric evaluation.	Building on a standard neoclassical growth framework, the authors find that European support as such did not improve the countries' growth performance. However, the

PUBLICATION	IMPACT FOUND	METHOD USED	CONCLUSION
European cohesion policy			authors find evidence that it enhances growth in countries with the 'right' institutions.
Becker, Egger, & Von Ehrlich (2013): Too much of a good thing? On the growth effects of the EU's regional policy	EU transfers enable faster growth in the recipient regions as intended, but the authors estimate that in 36% of the recipient regions the transfer intensity exceeds the aggregate efficiency maximizing level and in 18% of the regions a reduction of transfers would not even reduce their growth.	Generalized propensity score estimation	The authors conclude that some reallocation of the funds across target regions would lead to higher aggregate growth in the EU and could generate even faster convergence than the current scheme does.
Fratesi and Perucca (2014) Territorial capital and the effectiveness of cohesion policies: an assessment for CEE regions	Regional policy is not so much effective per se but its impact depends on the type and amount of territorial capital possessed by the region. Regions more endowed with territorial capital appear to be more able to take advantage from the policy support of structural funds.	Cross-section regressions using NUTS-3 level data	Agglomeration economies play a role in some infrastructural policies; It is not the largest urban areas that take advantage from these investments but the intermediate ones; Rural areas, also don't take advantage of the hard investments, which questions the whole role of Structural Funds since these regions tend to be the poorest and less developed ones.
Crescenzi and Giua (2016): The EU cohesion policy in context: Does a bottom-up approach work in all regions?	Positive, but stronger in richer regions (not really convergence then). EUCP interacts with CAP and other non-geographically targeted policies.	A policy augmented model of regional growth	Bottom-up approaches are not sufficient, and must be complemented by top-down approach.
Percoco (2016): The impact of European cohesion policy in urban and rural regions	The impact of cohesion policy depends on the economic structure of regions.	Regression discontinuity design with heterogeneous treatment	The higher the share of service sector activity, the lower the detected impact of

PUBLICATION	IMPACT FOUND	METHOD USED	CONCLUSION
			policy investing heavily in this sector
Surubaru (2016): Administrative capacity or quality of political governance? EU cohesion policy in the new Europe, 2007–2013	Governance and domestic political factors may mediate the effects of redistributive policies, such as European cohesion policy	The paper relies on qualitative interviews and quantitative questionnaires with selected stakeholders	Taking stock of domestic political governance is essential to explaining the ability of new member states to manage European Union regional and cohesion policy.
Gagliardi and Percoco (2016): The impact of European Cohesion policy in urban and rural regions	Cohesion policy enhances regional growth overall, but does so more significantly in the case of rural regions close to a city.	Regression discontinuity design	Geographical characteristics influence the impact of Cohesion policy
Becker, Egger and von Ehrlich (2018): Effects of EU Regional Policy: 1989-2013	The effects of losing Objective 1 status on economic growth are negative, and the earlier positive effects on growth in the period(s) of Objective 1 treatment more or less undone.	Fuzzy regression discontinuity design (RDD) in a two-stage least-squares approach	Regional policy has a positive, but short-lived, effect on growth; the loss of eligibility in fact comes with a negative effect that offsets previous positive effects.

Source: Bruegel

ANNEX A2 ECONOMETRIC ANALYSIS

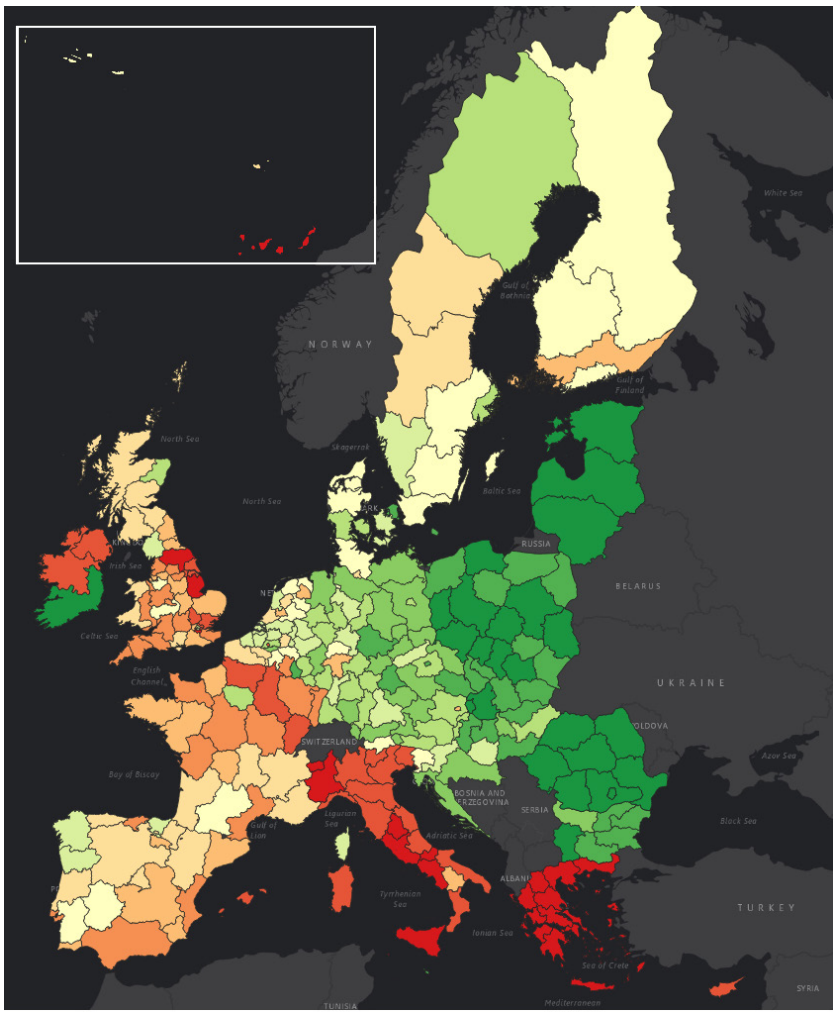
A2.1 EMPIRICAL CONVERGENCE MODELS

Cohesion policy primarily aims at fostering economic convergence across European regions. Its success (or failure) is therefore first and foremost to be assessed against this background. This, however, does not imply that economic convergence (in terms of income per capita) is the sole indicator of the success of programmes and funds, as many other goals have increasingly characterised the allocation of funding, such as social inclusion and environmental protection. Yet in our econometric calculations we focus on the primary aim by analysing GDP per capita developments at the regional level, because helping poorer regions to catch up with more advanced regions still represents the overarching goal of cohesion policy. Our analysis could be complemented with the analysis of other objectives, but those are harder to measure and related indicators at local level are much rarer.

Since traditional econometric analysis of the impact of cohesion policy is burdened with various endogeneity problems, we adopted a new methodology to assess the possible impact of cohesion policy. We estimated a quantitative econometric model to identify the regions of the European Union that have performed best and worst relative to other similar regions, by controlling for various factors, but we did not control for cohesion policy indicators. Instead, we controlled for a set of variables that, according to classic economic theory, should explain the different convergence paths. Thereby, we identified the regions that performed the best and the worst. In a next step, we looked at the programmes that were implemented in the best and worst-performing regions and analysed the aspects that differentiate them from each other. We will not be able to claim whether cohesion programme characteristics explain the differences in economic performance, but we trust that our analysis nevertheless highlights interesting patterns in the data.

Before the econometric work, it is useful to look at GDP growth over the period of 2003-2015, to see which regions and/or countries have had relatively stronger or weaker performances. We selected this period for data availability reasons, and also with a view to having several years both before and after the most acute phases of the global and European financial and economic crisis, which started to escalate after the collapse of Lehman Brothers in September 2008. Our sample period covers, although not entirely, three EU multi-annual financial framework periods (2000-2006, 2007-2013, 2014-2020).

Figure 10: Classification of EU regions according to growth of GDP per capita at PPS, 2003-2015, NUTS-2 regions



Note: colours refer to different deciles in terms of GDP growth per capita measured at purchasing power standards (PPS). Regions in dark green performed best, whereas the opposite is true for regions in dark red.

Figure 10 shows that the fastest-growing NUTS-2 regions of the EU were in the three Baltic countries, Poland, Slovakia, Romania and in the southern part of Ireland. On the other hand, Greece experienced a particularly dramatic recession. Later in our regression analysis we found that nearly all worst-performing regions in terms of GDP growth between 2003 and 2015, both unconditionally and conditionally on the set of control variables we present in detail below, are Greek regions. Considering this, we ran all our regressions on two different datasets: the full dataset including all EU regions, and a second one from which Greek regions were excluded. Although the significant regressors are not sizeably influenced by these alternative samples, we prefer to consider the second sample when focusing on relative performance, as the negative performance of Greek regions could obscure relevant patterns in terms of project characteristics.

In most of this Annex we use NUTS-2 level data, because some data on project characteristics and disbursement by EU funds is available only at the NUTS-2 level. However, for robustness analysis, we estimate some of our regressions using the more detailed NUTS-3 level data too.

A2.2 UNCONDITIONAL CONVERGENCE

In principle, we would expect regions with lower income levels to grow faster, as the baseline neoclassical growth model prescribes (Solow 1956, Swan 1956): less advanced areas, with lower capital per capita ratios, should enjoy relatively higher marginal productivity of production factors, thereby advancing towards their long-run GDP per capita equilibrium level[29]. The first regression we ran is thus a simple regression of the growth rates on initial levels of GDP per capita, where we expect to obtain a negative coefficient (i.e. a negative beta parameter in the equation below):

$$log(GDP_{2015,i}) - log(GDP_{2003,i}) = \alpha + \beta\left(log(GDP_{2003,i}) - \frac{1}{N}\sum_{i=1}^{N} log(GDP_{2003,i})\right) + \varepsilon_i,$$

Where GDP denotes GDP per capita at PPS, *i* indicates the region. Since we subtract the average of all regions from the initial GDP per capita, the estimated value of α will indicate the total average growth of the regions from 2003 to 2015.

An important question is whether we use a pure cross-section regression spanning the whole period from 2003 to 2015, or if we divide this period into certain sub-periods and adopt a panel data model. We decided to use the cross-section specification to reflect long-run developments. The use of sub-samples for a panel framework would be burdened by the impact of the characteristics of specific periods, such as the unsustainable pre-crisis economic boom in a number of EU countries, the impact of global and European financial crises, and the more recent recovery. Since these three phases of economic performance had different durations and magnitudes across the EU, inserting time effects into a panel regression would have not been sufficient to control for them properly. We therefore decided to run cross-section regressions in this report.

We estimated equation (1) both for NUTS-2 and NUTS-3 regions in order to see the differences. We also estimated equation (1) both without and with country dummies, in order to see country-wide effects and also if there is within-country convergence on average (Table 13).

When including country-dummies in the regression, the following specification was estimated:

$$log(GDP_{2015,c,i}) - log(GDP_{2003,c,i}) = \eta_c + \beta\left(log(GDP_{2003,c,i}) - \frac{1}{N_c}\sum_{i=1}^{N_c} log(GDP_{2003,c,i})\right) + \varepsilon_{c,i}$$

c: Country

i: Region

N_c: the number of (NUTS2 or NUTS3) regions in country c.

While η_c is a parameter to estimate for each country, our specification implies that it will be equal to: $\eta_c = \frac{1}{N_c}\sum_{i=1}^{N_c} log(GDP_{2015,c,i}) - log(GDP_{2003,c,i})$. That is, the country-specific constant represents the average of the growth rate across the regions of the country.

[29] The steady-state GDP per capita level can still vary across regions depending on supposedly exogeneous factors, such as the savings rate, the population growth rate and the rate of technological progress.

Table 13: Unconditional convergence analysis

	(1) NUTS3	(2) NUTS2	(3) NUTS3	(4) NUTS2
	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015
Level of GDPpc PPS in 2003 (demeaned to the overall average)	-0.202*** (-15.81)	-0.229*** (-8.07)		
Level of GDPpc PPS (demeaned to the country average)			-0.0320** (-2.47)	0.0353 (1.38)
Constant	0.281*** (58.15)	0.267*** (26.44)		
Austria			0.373*** (29.88)	0.348*** (16.64)
Belgium			0.263*** (23.36)	0.263*** (11.79)
Bulgaria			0.491*** (16.39)	0.568*** (12.43)
Croatia			0.321*** (10.10)	0.404*** (64.36)
Cyprus			0.144 (.)	0.144 (.)
Czech Republic			0.402*** (20.80)	0.415*** (18.25)
Denmark			0.333*** (15.09)	0.321*** (14.15)
Estonia			0.619*** (26.59)	0.679 (.)
Finland			0.276*** (13.21)	0.235*** (18.53)
France			0.201*** (25.23)	0.220*** (17.13)
Germany			0.358*** (73.62)	0.347*** (33.65)
Greece			-0.0462*** (-3.13)	-0.0388** (-2.37)

	(1) NUTS3	(2) NUTS2	(3) NUTS3	(4) NUTS2
	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015
Hungary			0.372*** (16.77)	0.392*** (20.67)
Ireland			0.327*** (3.33)	0.358* (1.93)
Italy			0.0995*** (14.57)	0.117*** (9.57)
Latvia			0.683*** (14.67)	0.688 (.)
Lithuania			0.717*** (20.18)	0.755 (.)
Luxembourg			0.419 (.)	0.419 (.)
Malta			0.380*** (8.77)	0.428 (.)
Netherlands			0.241*** (19.21)	0.262*** (24.92)
Poland			0.624*** (52.00)	0.620*** (48.10)
Portugal			0.291*** (14.82)	0.232*** (12.05)
Romania			0.804*** (41.66)	0.847*** (31.29)
Slovakia			0.597*** (19.38)	0.613*** (31.02)
Slovenia			0.265*** (16.28)	0.275*** (14.56)
Spain			0.195*** (15.97)	0.197*** (11.94)
Sweden			0.265*** (24.31)	0.280*** (24.40)
United Kingdom			0.187*** (28.71)	0.194*** (19.56)
Observations	1341	275	1341	275
Adjusted R^2	0.25	0.29	0.93	0.97

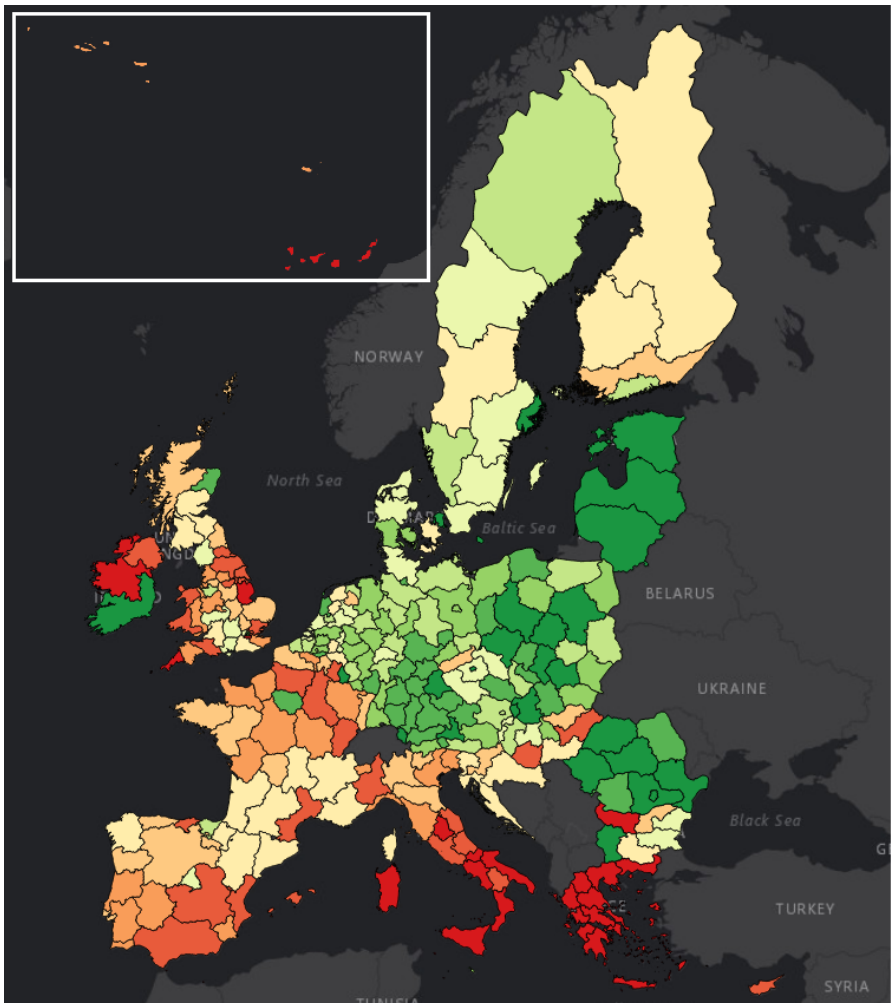
Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. For some countries the number of regions is only one and therefore (.) appears instead of the t statistics. GDP growth measured as the difference between the logarithm of GDP per capita at PPS in 2015 and in 2003. Level of GDP per capita at PPS in 2003 also in logarithms and de-meaned to the global average (that is, the average value of all regions is subtracted).

As Table 13 shows, unconditional convergence took place across both NUTS-2 and NUTS-3 regions within the European Union between 2003 and 2015. On average, the lower the starting level of GDP in PPS, the higher the growth experienced in the twelve subsequent years. The average NUTS-3 growth rate of GDP per capita at PPS was 30.7%, which translates to approximately 2% per year. However, when we controlled for country effects, the results differed for NUTS-3 and NUTS-2 regions. For NUTS-3 regions the regression indicates some, albeit small, convergence to the country-wide average, but with NUTS-2 regions the initial level of income is not significant anymore and its point estimate is even positive. These results suggest that within-country divergences are still a predominant feature of regional development. The difference between the NUTS-3 and the NUTS-2 models are partly explained by the elimination of significant variation in a country-fixed effects model, which already focuses only on within-country variation. Firstly, six countries are disregarded when looking at how the initial level of income dictated growth paths, because they only have one NUTS-2 region: Cyprus, Estonia, Denmark, Latvia, Luxembourg and Malta. Secondly, the aggregation into larger units, if bundling together better-performing and worse-performing regions, can result in NUTS-2 regions which are comparable in initial levels of GDP and growth paths, despite large differentials between the NUTS-3 regions. Croatia, Ireland, Slovenia, with two regions each, are examples.

Country effects point in the direction we would expect, with regions of Italy and Spain presenting some of the lowest average growth – 10% and 20% respectively. Greece, unsurprisingly, shows a negative average NUTS-3 growth rate, at approximately 5%. The United Kingdom, more interestingly, shows an average growth rate of only 18.7%, owing to great regional discrepancies. The success cases are Romania (80%), Lithuania (72%) and Poland (62%). Germany also distinguishes itself somehow from the rest of the more advanced economies, registering an average growth rate of 36%, closer to that of Hungary than of France or the Netherlands.

Figure 11 presents the classification of growth performance of EU regions when we control for the initial income level (but not for country effects). While a number of regions of Poland, Slovakia, Romania, the Baltics and Ireland remain among the top performers, there are also some notable differences to the classification presented in Figure 10.

Figure 11: Classification of EU regions according to growth when controlling for the initial income level, 2003-2015, NUTS-2 regions



Note: Map based on quantiles of the residuals of the EU unconditional convergence model without country dummies (column 1 of Table 13). Regions in dark green experienced the fastest economic growth (in per capita PPS-adjusted terms) when controlling for their initial level of development, while regions in dark red had the weakest economic growth.

A2.3 CONDITIONAL CONVERGENCE

Unconditional convergence is, however, not the appropriate baseline for determining top and best performers, because there are substantial differences between regions in terms of initial conditions and in terms of potential growth. The equilibrium long-run level of GDP per capita is highly affected by the savings rate, by the stock of human and physical capital and by population growth rates. Moreover, equilibrium growth depends on technology, which is not necessarily at the same advanced level across regions. It is important to control for such differences, not least because our ultimate aim is to compare

the characteristics of cohesion policy programmes between the best and the worst growing regions and thus we should filter out the impact of as many other factors as possible.

Therefore, we augment our regression with a set of region-specific control variables, denoted as $\boldsymbol{x_i}$:

$$log(GDP_{2015,i}) - log(GDP_{2003,i}) = \alpha + \beta\left(log\left(GDP_{2003,i}\right) - \frac{1}{N}\sum_{i=1}^{N} log\left(GDP_{2003,i}\right)\right) + \boldsymbol{\gamma x_i} + \varepsilon_i$$

Cohesion programmes promote convergence in various ways: by increasing the equilibrium level stock of capital (e.g. by investing in infrastructure and promoting co-investment), by increasing the stock of human capital (by, for instance, promoting the acquisition of new skills or higher education take up), and by influencing technology itself (e.g. promoting innovation and spreading technology). Furthermore, cohesion policy can influence income per capita through its influence on labour markets and population movements.

In order to reduce endogeneity problems in our regression, we abstain from controlling for factors contemporaneous to the period of growth analysed – 2003 through 2015. There are only two exceptions: (1) the earliest regional institutional quality data we used is available for 2010 (and thereby we implicitly assumed that neither economic growth from 2003-2010, nor cohesion policy during this period influenced institutional quality); and (2) in one specification we controlled for the growth of the tertiary sector from 2003 to 2015. Regarding the latter indicator, such a structural transformation is a powerful driver of economic growth and it is important to include a related variable in the regression. In terms of the identification of best and worst-performing regions, we assumed that project characteristics do not have a substantial impact on such broad structural shifts in the economy.

We proceeded step by step in order, gradually integrating different factors that might potentially confuse the assessment of cohesion policy. We present different specifications, based on different assumptions, while we compare how the set of best and worst performers change depending on the different specifications. By isolating patterns and regularities, we are able to identify the most and least-successful regions at achieving economic convergence compared to their peers. Only then did we compare our results with the programmes that ran in each region, in order to capture potential drivers of success – although we abstain from claiming any direct causality, because the complicating factors are too many and too intertwined to justify for such statement.

Across different, slightly varying, specifications, we thus include different factors. Throughout all models of Table 14: and

Table 15 we include:

- A measure of physical capital in 2003, namely the ratio of capital to output that we constructed at NUTS-2 level. A higher proportion of capital over income, all other things being equal, suggests that the economy is at a more advanced stage of development and closer to its steady-state growth rate.
- The population growth rate between 2000 and 2003, that is, the growth rate of the population before the sample period of our dependent variable, GDP growth from 2003-2015. *Ceteris paribus*, higher population growth should imply a lower capital per worker ratio and lower long-term GDP per capita.
- Elements related to the structure of the economy. These include the population density in 2003 in the corresponding NUTS-2 regions and the share of workers employed in the services sector. *Ceteris paribus*, urban regions with a higher share of employees who work neither in agriculture nor in manufacturing should be more advanced and closer to the technological frontier.
- An index on the quality of governance at NUTS-2 level. It is hard to overstate the importance of effective, impartial and transparent institutions in enabling sustainable and sizeable economic growth. Good regional governance is all the more crucial in the case of lagging regions where good or bad investment decisions are likely to have long-lasting consequences. All other things being equal, then, we expect local entities with better institutional quality to fare better compared to their peers. As the index is available only for 2010, 2013 and 2017, we use 2010 values. The implied assumption is that cohesion policy is not able to substantially change the quality of governance – although it is possible that economic growth has an impact on the quality of governance.

Depending on the specification, we included as well different measures of human capital and of innovation:

- Measures of human capital, namely the percentage of the population (i) aged 25-64 with tertiary education (models 1 and 2 in Table 13); and (ii) aged 25-64 with upper secondary or higher education (models 3 and 4 in Table 13), all data referring to 2003. The higher the share of highly educated workers, the larger the ratio of human capital per worker in the economy, and therefore the higher the expected steady-state GDP per capita (Mankiw *et al*, 1992).
- Percentage of employment in R&D activities in 2003 is added in specifications 2, 3 and 4.

Annex 5 details our data sources and the adjustment we made.

All independent variables included exhibit the sign we would expect according to economic theory. All other things being equal, GDP per capita growth from 2003 to 2015 is (i) lower for countries that have higher initial levels of PPS GDP per capita; (ii) increasing (if rarely statistically significant) in the quality of governance indicator; (iii) decreasing in the starting level of capital to output ratio; (iv) decreasing (although the coefficient is not always significant) in the percentage of young people with no recent education or training; (v) decreasing in the share of employees in the tertiary sector in 2003; (vi) decreasing in the rate of population growth from 2000 to 2002; (vii) increasing in the percentage of the population with higher education levels (notwithstanding the specific index chosen to measure it).

Table 14: Conditional convergence analysis (including 28 EU member states), NUTS-2

	(1)	(2)	(3)
	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015
Level of GDPpc PPS in 2003 (demeaned to the overall average)	-0.180*** (-5.13)	-0.263*** (-7.27)	-0.263*** (-7.28)
Capital income ratio in 2003	-5.850*** (-6.21)	-4.760*** (-4.89)	-4.739*** (-4.80)
% of employment in tertiary sector in 2003	-0.00531*** (-4.46)	-0.00418*** (-3.63)	-0.00552*** (-3.82)
Growth in population 2000-2003	-1.975*** (-4.12)	-1.761*** (-4.20)	-1.575*** (-3.43)
Population density in 2003	3.47e-09*** (3.30)	3.26e-09*** (4.57)	3.38e-09*** (4.72)
Quality of governance	0.00229*** (2.95)	0.00266*** (3.80)	0.00244*** (3.63)
Percentage from 25-64 with tertiary education in 2003	0.00434*** (3.05)	0.000890 (0.59)	0.00131 (0.87)
R&D personnel in % of total employment in 2003		0.0801*** (4.88)	0.0794*** (4.76)
Growth in tertiary sector employment 2003-2015			-0.265 (-1.59)
Constant	0.586*** (7.21)	0.463*** (5.57)	0.576*** (5.62)
Observations	275	275	275
Adjusted R^2	0.52	0.56	0.56

Note: t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Source: Bruegel

Table 15: Conditional convergence analysis (including 27 member states without Greece), NUTS–2

	(1)	(2)	(3)
	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015
Level of GDPpc PPS in 2003 (demeaned to the overall average)	-0.132*** (-3.98)	-0.209*** (-6.25)	-0.210*** (-6.27)
Capital income ratio in 2003	-3.933*** (-4.30)	-2.909*** (-3.11)	-2.869*** (-3.07)
% of employment in tertiary sector in 2003	-0.00708*** (-6.31)	-0.00603*** (-5.60)	-0.00700*** (-5.39)
Growth in population 2000-2003	-1.711*** (-3.93)	-1.533*** (-4.01)	-1.404*** (-3.35)
Population density in 2003	2.69e-09*** (2.84)	2.53e-09*** (3.80)	2.63e-09*** (3.92)
Quality of governance	0.000765 (1.01)	0.00114* (1.66)	0.00101 (1.52)
Percentage from 25-64 with tertiary education in 2003	0.00491*** (3.50)	0.00193 (1.32)	0.00223 (1.53)
R&D personnel in % of total employment in 2003		0.0701*** (4.63)	0.0698*** (4.57)
Growth in tertiary sector employment 2003-2015			-0.190 (-1.23)
Constant	0.745*** (10.68)	0.626*** (8.96)	0.705*** (8.36)
Observations	262	262	262
Adjusted R2	0.56	0.59	0.60

Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Bruegel

Table 16: Conditional convergence analysis (including 27 member states without Greece), NUTS–3

	(1)	(2)	(3)
	GDP Growth 2003-2015	GDP Growth 2003-2015	GDP Growth 2003-2015
Level of GDPpc PPS in 2003 (demeaned to the overall average)	-0.156*** (-11.13)	-0.167*** (-11.96)	-0.172*** (-12.33)
Capital income ratio in 2003	-1.624*** (-3.75)	-1.266*** (-2.82)	-1.326*** (-2.94)
% of employment in tertiary sector in 2003	-0.00956*** (-17.26)	-0.00936*** (-16.69)	-0.0118*** (-19.34)
Growth in population 2000-2003	-0.725*** (-3.59)	-0.741*** (-3.71)	-0.533*** (-2.60)
Population density in 2003	2.43e-09*** (5.09)	2.40e-09*** (5.10)	2.63e-09*** (5.33)
Quality of governance	0.00155*** (4.50)	0.00159*** (4.71)	0.00124*** (3.63)
Percentage from 25-64 with tertiary education in 2003	0.00585*** (7.20)	0.00474*** (5.46)	0.00551*** (6.44)
R&D personnel in % of total employment in 2003		0.0205*** (2.90)	0.0181*** (2.60)
Growth in tertiary sector employment 2003-2015			-0.480*** (-5.67)
Constant	0.745*** (21.26)	0.723*** (20.41)	0.926*** (20.94)
Observations	1289	1289	1289
Adjusted R2	0.49	0.50	0.51

Note: t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

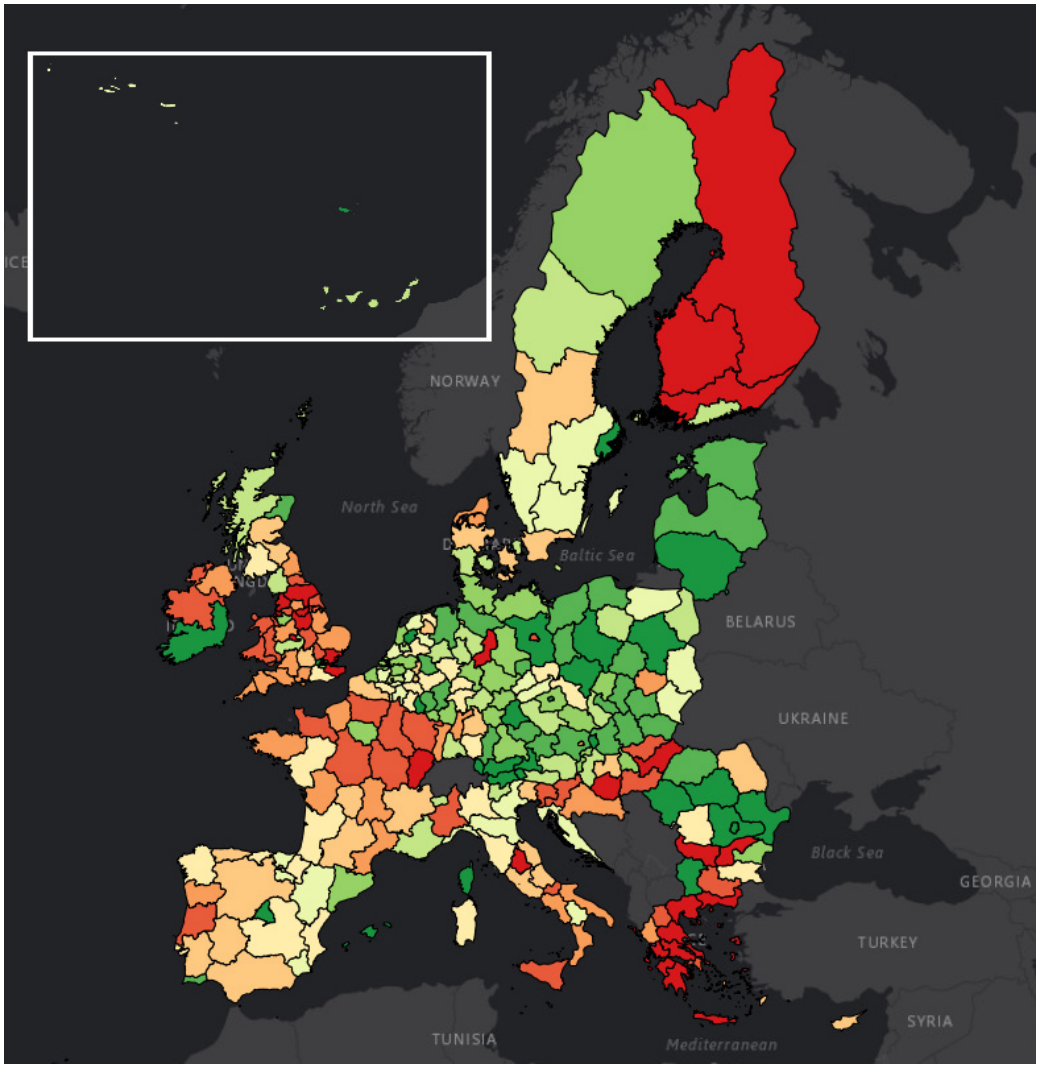
Source: Bruegel

In order to isolate the effect that might be caused by idiosyncratic national trends, we tested a different specification including dummies for each country[30]. Greece experienced a very different economic evolution during the period 2003-2015 compared to, for instance, The Netherlands, because of the divergence in terms of macroeconomic fundamentals and the austerity measures implemented after the crisis. These, in turn, had repercussions for each Greek local entity's performance, as also illustrated in Greece's negative average growth rate in Table 13. For this reason, we re-estimated our models without country effects, but excluding Greece (Table 15). As a robustness test, we estimate the same models using NUTS-3 level data (Table 16). Interestingly, quality of governance loses its statistical significance when the sample does not include Greece when using NUTS-2 level data, but it is highly statistically significant when using NUTS-3 level data. Coefficients on population density and capital income ratio decrease in magnitude when Greece is removed from the sample, owing to its relatively low population density and low capital ratio. Differences in the percentage of employment in the tertiary sector, on the other hand, become more important in terms of explaining growth differentials, especially when using NUTS-3 level data, in which case all three specifications resulted in a statistically significant estimate. These are arguably less biased estimates since they do not mistakenly attribute Greek underperformance, known to be crisis-related, to its initial conditions.

We used model (3) without Greece considering NUTS-2 data as our baseline scenario for further analysis. The residuals of this regression correspond to the part of economic growth left unexplained by the variables we included, which we call 'conditional economic growth'. This corresponds to 'extra growth' in addition to the growth that would have been explained by the fundamental growth determinants we considered. In the main part of the report we compare this 'conditional economic growth' with various characteristics of EU-funded the programmes and projects. Other variables which were tried but were not significant include business demographics, health indicators and a dummy for whether a region is rural.

[30] To save space, we do not report the detailed results for this specification.

Figure 12: Classification of EU regions according to growth when controlling for various initial conditions, 2003-2015, NUTS-2



Note: Map based on quantiles of the residuals of the EU conditional convergence model (Table 14:, model 3).

ANNEX A3 ROBUSTNESS TO THE USE OF NUTS-3 DATA

While we ran our regressions using both NUTS-2 and NUTS-3 level data in Annex 3, we were compelled to use NUTS-2 data for our analysis of project characteristics in the main part of this report because information on EU funding and the project-level data in one of the two main datasets (the '4P dataset', see Section 3.2) is available only for the NUTS-2 level. Therefore, we reported NUTS-2 results in the main part of this report. However, the other project-level dataset, which includes only inter-regional projects, is available at the NUTS-3 level too. In this annex we check the robustness of our findings to the use of NUTS-2 or NUTS-3 levels of data from this dataset.

Table 17, Table 18 and Table 19 show that our results are robust to the use of NUTS-2 or NUTS-2 levels of data, since the signs of the estimated correlation coefficients are almost always the same and their significance levels are also rather similar.

Table 17: Correlation between unexplained economic growth and summary project characteristics using the interregional dataset: NUTS-2 vs. NUTS-3 results

	NUTS 2		NUTS 3	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Duration	-0.082	0.189	-0.005	0.878
Co-financing (general)	**-0.111**	**0.075**	**-0.056**	**0.068**
Co-financing (leader)	**-0.110**	**0.077**	**-0.053**	**0.084**

Note: National co-financing (general) is the average co-financing rate of projects in which an entity of the NUTS-2 region is involved, while national co-financing (leader) is the average co-financing rate of projects in which an entity of the NUTS-2 region is the lead partner of the project. Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to project characteristics from the interregional dataset (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

Table 18: Correlation between unexplained economic growth and various indicators related to interregional funds: NUTS-2 vs. NUTS-3 results

	NUTS 2		NUTS 3	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Estimated INTERREG budget	**0.124**	**0.047**	**0.153**	**0.000**
Number of INTERREG projects	**0.114**	**0.067**	**0.127**	**0.000**
Estimated INTERREG budget per capita	**0.168**	**0.007**	**0.066**	**0.029**
Number of INTERREG projects per capita	**0.166**	**0.008**	0.015	0.615
Estimated INTERREG budget from projects where the region is the lead partner	0.061	0.347	**0.124**	**0.001**
Number of INTERREG projects where the region is the lead partner	0.029	0.653	**0.066**	**0.069**
Proportion of projects where the region is the lead partner	-0.049	0.452	-0.001	0.974

Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to interregional funds (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

Table 19: Correlation between unexplained economic growth and sector breakdown of projects using the inter-regional dataset: NUTS-2 vs. NUTS-3 results

	NUTS 2		NUTS 3	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Environment	**0.117**	**0.061**	**0.057**	**0.062**
Innovation	-0.079	0.204	-0.032	0.299
ICT	**-0.166**	**0.008**	**-0.055**	**0.072**
Territorial Cohesion	0.005	0.939	0.007	0.828
Urban Development	-0.004	0.954	0.004	0.889
Rural Development	**-0.141**	**0.023**	**-0.060**	**0.050**
Business	**-0.211**	**0.001**	**-0.094**	**0.002**
Education & Training	0.066	0.291	0.003	0.921
Transport	-0.052	0.406	0.027	0.383
Energy & Infrastructure	-0.013	0.839	0.041	0.175
Social Inclusion	-0.009	0.883	-0.024	0.429
Tourism & Culture	**0.115**	**0.065**	0.010	0.742
Health	0.010	0.869	-0.000	0.989

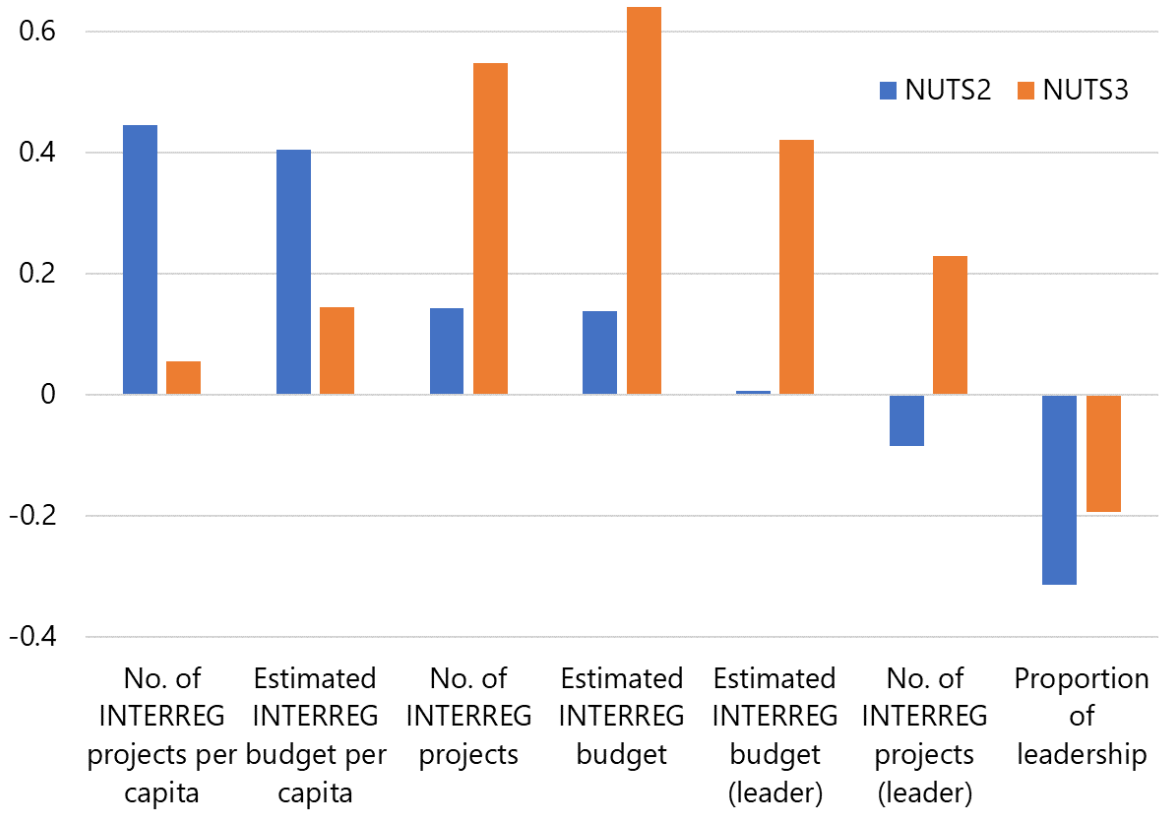
Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and percentage of projects which include the sector listed on the row labels among its related themes. The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

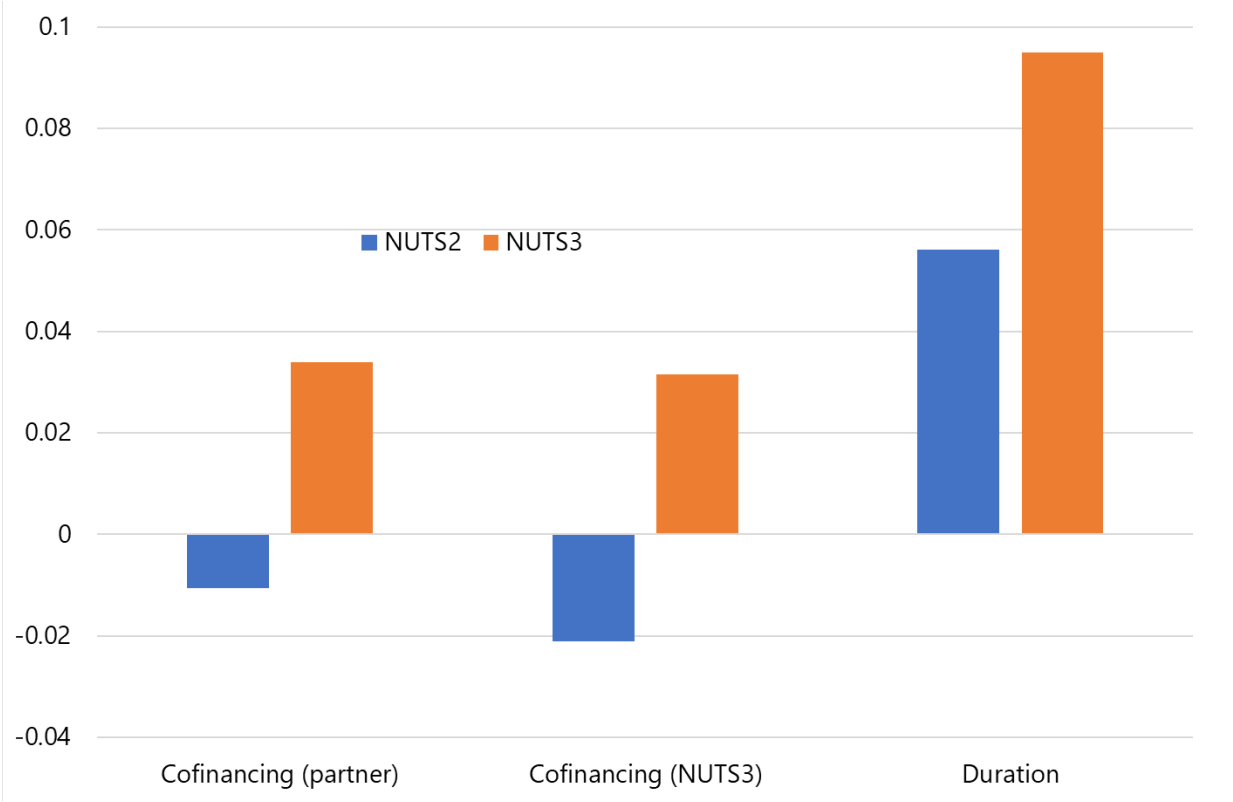
Source: Bruegel

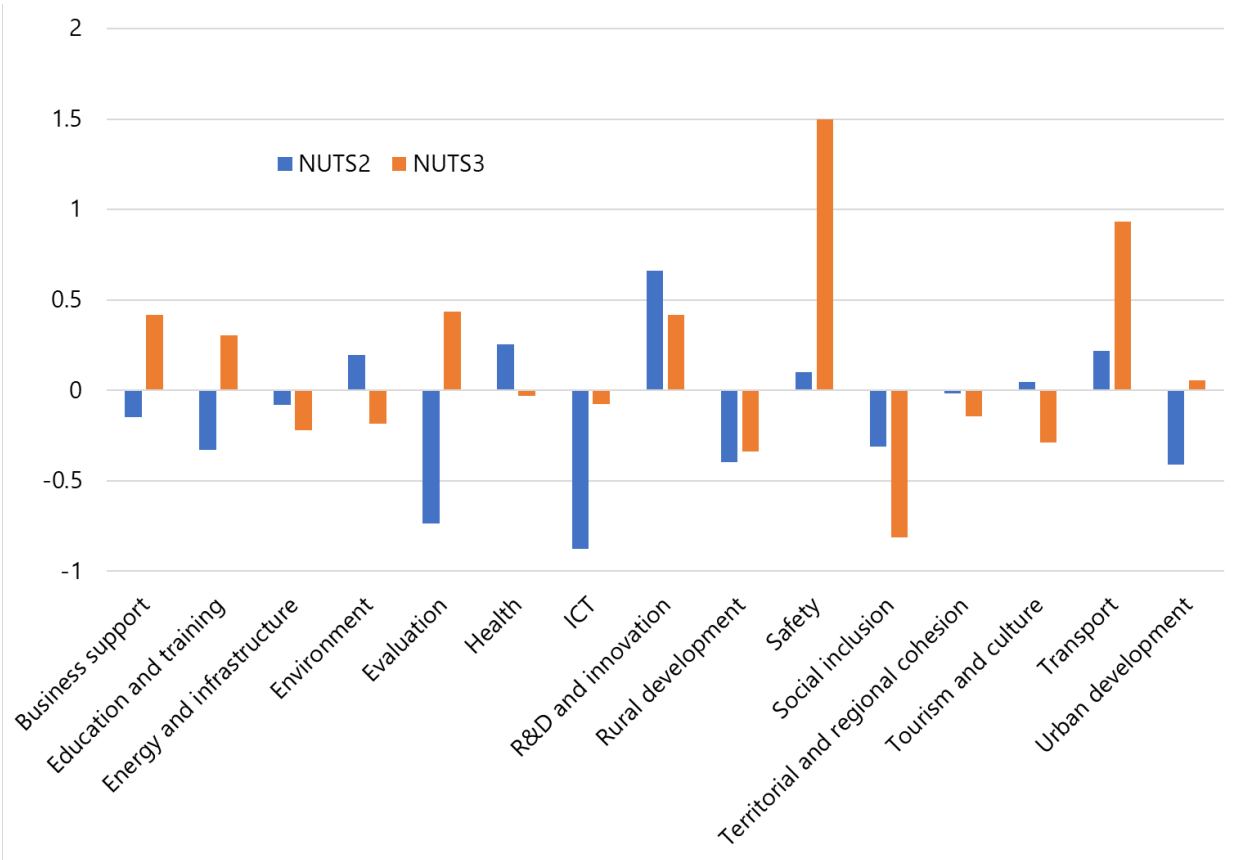
Figure 13 compares the quartile analysis of best and worst performers when using either NUTS-2 or NUTS-3 data from the interregional dataset (see Figure 9 in the main text for our benchmark results). The variables related to structural features of interregional projects are remarkably consistent across the two layers of the regions. The only main difference relates to the co-financing rate of projects, which has a different sign depending on the use of NUTS-2 and NUTS-3 data. The results for duration, on the other hand, are very similar suggesting that longer duration projects are associated with better outcomes, with even stronger results when NUTS-3 regions are used.

The analysis is more nuanced when it comes to sectoral analysis, possibly reflecting our conclusion form the main part of this report suggesting that the role of different sectors is ambiguous.

Figure 13: Differences in project characteristics between the first and the last quartiles of regions by country concerning unexplained economic growth: comparison of NUTS-2 and NUTS-3 results




0.1
0.08
0.06
0.04
0.02
0
-0.02
-0.04
NUTS2
NUTS3
Cofinancing (partner)
Cofinancing (NUTS3)
Duration


2
1.5
1
0.5
0
-0.5
-1
NUTS2
NUTS3
Business support
Education and training
Energy and infrastructure
Environment
Evaluation
Health
ICT
R&D and innovation
Rural development
Safety
Social inclusion
Territorial and regional cohesion
Tourism and culture
Transport
Urban development

ANNEX A4 ROBUSTNESS TO THE EXCLUSION OF MORE DEVELOPED REGIONS

More-developed regions (with GDP per capita at PPS over 90% of the EU average) receive very little as a share of GDP, just 0.07%, from ERDF and ESF (Table 4). Countries with GDP per capita at PPS over 90% do not receive funding from the Cohesion Fund. Because of this rather low level of EU cohesion funding, it is unlikely that EU cohesion funds have a material impact on GDP growth in the more-developed regions. Therefore, as a robustness analysis, we studied the association between unexplained economic growth and project characteristics by excluding more-developed regions.

We found that our results were generally robust, though there were some differences between the full sample and the restricted sample that excludes more-developed regions.

The Cohesion Fund continued to be the only fund that has a positive association with unexplained economic growth when we excluded the more-developed regions (Table 20), similarly to what we found for the full sample (Table 6, page 46).

Table 20: Correlation between unexplained economic growth and funds received in euros (either total for the region or per capita), NUTS-2 regions, more developed regions are excluded

	COHESION FUND		ERDF		EAFRD		ESF	
	Correlation coefficient	p-value	Correlation coefficient	p-value	Correlation coefficient	p-value	Correlation coefficient	p-value
2007-2015, total	**0.260**	**0.010**	-0.159	0.120	-0.169	0.103	-0.119	0.248
2007-2015, per capita	**0.177**	**0.084**	-0.136	0.183	**-0.180**	**0.082**	-0.065	0.529
2007-2013, total	**0.317**	**0.006**	-0.162	0.112	-0.157	0.129	-0.124	0.224
2007-2013, per capita	**0.205**	**0.082**	-0.167	0.1030	**-0.213**	**0.038**	-0.065E	0.526
2003 – 2015, total	**0.283**	**0.015**	**-0.213**	**0.036**	**-0.211**	**0.040**	-0.166	0.104
2003-2015, per capita	**0.205**	**0.083**	-0.167	0.102	**-0.214**	**0.037**	-0.065	0.529

Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and funds received in euros (either total for the region or per capita, and in different time periods, as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel.

The results for duration and the national co-financing rate somewhat depended on sample. When using the 4P dataset and excluding the more developed regions, duration still had a positive correlation coefficient with unexplained economic growth, but was not significant (Table 21). On the contrary, when using the interregional dataset, duration was not statistically significant for the full sample but

highly significant with a positive estimate (0.165) for the restricted sample that excluded more-developed regions (Table 22). The national co-financing rate continued to have a negative correlation with unexplained economic growth when using both datasets, but these correlation coefficients were no longer significant, possibly because of the more limited variation in the co-financing rate when more-developed regions are excluded. The positive association with national management, and the negative association with regional management, are similar, and in fact even stronger, when more-developed regions are excluded (Table 21).

Table 21: Correlation between unexplained economic growth and summary project characteristics (4P dataset), NUTS-2 regions, more developed regions are excluded

	All regions		**Without developed**	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Duration	**0.197**	**0.004**	0.132	0.228
National co-financing	**-0.204**	**0.002**	-0.163	0.122
No. of beneficiaries	-0.034	0.611	0.063	0.566
Private proportion	**0.189**	**0.004**	0.124	0.243
NGO proportion	**0.124**	**0.058**	0.082	0.439
Public proportion	0.021	0.746	-0.053	0.621
Academia proportion	-0.057	0.385	0.058	0.587
No. of managing authorities	0.004	0.950	0.133	0.217
National proportion	**0.178**	**0.001**	0.158	0.139
Regional proportion	**-0.178**	**0.001**	-0.158	0.139
No. of related sectors	-0.019	0.772	0.094	0.373

Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to project characteristics from the 4P dataset (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

Table 22: Correlation between unexplained economic growth and summary project characteristics (interregional dataset), NUTS-3 regions, more developed regions are excluded

	All regions		Without developed	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Duration	-0.005	0.878	**0.165**	**0.001**
National co-financing (general)	**-0.056**	**0.068**	-0.035	0.480
National co-financing (leader)	**-0.053**	**0.084**	-0.031	0.534

Note: National co-financing (general) is the average co-financing rate of projects in which an entity of the NUTS-3 region is involved, while national co-financing (leader) is the average co-financing rate of projects in which an entity of the NUTS-3 region is the lead partner of the project. Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to project characteristics from the interregional dataset (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

The role of interregional projects continued to be positively associated with unexplained economic growth, though when we excluded more-developed regions, only their budget was statistically significant, but not their number (Table 23).

Table 23: Correlation between unexplained economic growth and various indicators related to interregional funds, NUTS-3 regions, more developed regions are excluded

	All regions		Without developed	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Estimated INTERREG budget	**0.153**	**0.000**	**0.143**	**0.004**
Number of INTERREG projects	**0.127**	**0.000**	0.066	0.184
Estimated INTERREG budget per capita	**0.066**	**0.029**	0.001	0.984
Number of INTERREG projects per capita	0.015	0.615	**-0.125**	**0.012**
Estimated INTERREG budget from projects where the region is the lead partner	**0.124**	**0.001**	**0.137**	**0.0158**
Number of INTERREG projects where the region is the lead partner	**0.066**	**0.069**	0.017	0.763
Proportion of projects where the region is the lead partner	-0.001	0.974	-0.0733	0.197

Note: Correlation coefficient refers to the estimated correlation between unexplained economic growth and various indicators related to interregional funds (as indicated in the row labels). The p-value is the probability of finding the observed (or larger in absolute terms) correlation coefficient when it is actually zero. Thereby, a low p-value indicates evidence for a non-zero correlation coefficient. Bold numbers indicate estimates which have a p-value below 0.1, that is, which are statistically significant at the 10% level.

Source: Bruegel

ANNEX A5 DATA SOURCES AND ADJUSTMENTS

A5.1 SOURCES

Eurostat is the largest provider of data for our analysis, as its regional database[31] contains a number of useful indicators at NUTS-1, NUTS2 and NUTS-3 levels[32]. We gathered NUTS-2 data, but we also collected some NUTS-3 statistics. We used data from several Eurostat databases: (i) regional economic accounts, (ii) regional demographic statistics, (iii) regional education statistics, (iv) regional science and technology statistics, (v) regional business demography, (vi) regional labour market statistics. We also include a Quality of Government Index at NUTS-2 level compiled by the Government Institute of Gothenburg University, referring to its last (2017) edition. Finally, we create a variable on the capital to output ratio at NUTS-2 level. At times, we constructed occasionally missing data at NUTS-2 level in a sensible and targeted fashion that we describe case by case in the following section.

A5.2 ADJUSTMENTS

A few observations are missing for some variables of interest in specific years (the actual number of missing observations for each variable is listed in the relevant sections).

In general, we extrapolate missing values through the procedure described below.

If we lacked the data for a NUTS 'x' unit, but we have values for the 'parent' NUTS 'x-1' unit, we applied the same observed trend, or, if missing, the value itself, to the unit of interest. The Danish case provides a suitable example: data on population density is available only for Denmark as a whole (and for its single NUTS-1 region). Data for its NUTS-2 (NUTS-3) regions is available from 2005 (2006) onwards. We calculated the percentage change from 2005 to 2003 for Denmark, and applied it backwards across NUTS-2 regions to derive their 2003 value. As we have 2006 data for NUTS-3 regions, we calculated the percentage change for each NUTS-2 unit from 2006 to 2003 values (previously derived) and applied it to the belonging NUTS-3 regions. This way, we obtained reasonable estimates for our missing observations.

Sometimes the opposite is true, and we have data for NUTS-3 (2) regions but not for the overarching NUTS-2 (1) region. In such cases, it was usually simpler to aggregate (by summing or averaging, according to the specific variable) the underlying values.

Finally, some regions have been recoded from NUTS 2013 to NUTS 2016 classifications. For instance, the Hungarian NUTS-2 region Közép-Magyarország was discontinued and split into Budapest and Pest megye. Values were divided (in case of sums) or directly applied (in case of shares) to the two new regions. We have applied the same procedure to other similar cases.

[31] https://ec.europa.eu/eurostat/web/regions/data/database . In subsequent footnotes we list the Eurostat codes for the specific datasets.
[32] See the explanation of NUTS (Nomenclature of Territorial Units for Statistics) regions in footnote 5 on page 11.

A5.3 REGIONAL ECONOMIC ACCOUNTS

We focused on Gross Domestic Product data by NUTS-2 region in purchasing power standards (PPS) per inhabitant from 2000 to 2016[33], and we operated a logarithmic transformation. We then considered the level of this variable in 2003 and the difference between 2015 and 2003 levels (i.e. the percentage growth of GDP per capita in PPS over the 12-year period).

A5.4 REGIONAL DEMOGRAPHIC STATISTICS

We used the average annual population by NUTS-2 region from 2000 to 2016 (the same statistics that Eurostat uses to calculate per capita variables)[34] and the population density by NUTS-2 region[35]. The former serves as a basis for the population growth variable that we have constructed for the period 2000-2002. The latter shows 172 missing observations for 2003. We have generated them via different procedures: if data was available for (i) previous and/or subsequent years for the same NUTS-2 region and for (ii) the corresponding NUTS-1 region, we calculated the percentage change in the NUTS-1 region for the same time span and applied it to the NUTS-2 level. Other tailored remedies included the imposition of the same trend observed in subsequent years to the missing data point.

A5.5 REGIONAL EDUCATION STATISTICS

We used the database on educational attainments, and in particular we concentrated on (i) the percentage of population aged 25-64 with upper secondary, post-secondary non-tertiary and tertiary education (corresponding to levels 3 to 8 by international educational standards), (ii) the percentage of population aged 25-64 with tertiary education (levels 5 to 8)[36] and (iii) the percentage of population aged 18-24 which received neither formal nor non-formal education or training in the last four weeks preceding the survey by NUTS-2 region[37]. 28 observations were missing for the first two indicators. We followed the same procedure as in the previous case to replace them with sensible constructions.

A5.6 REGIONAL SCIENCE AND TECHNOLOGY STATISTICS

We used statistics on the percentage of total personnel and researchers in research and development (in full-time equivalent, FTE) over total employment by NUTS-2 region[38]. In order to estimate the 140 missing observations in 2003, we followed the usual procedure.

Data on patent applications by NUTS-2 region[39] is available only starting from 2008 and could be used at a later stage to assess the overall economic trends, also in terms of technological innovation and productivity.

[33] nama_10r_3gdp
[34] nama_10r_3popgdp
[35] demo_r_d3dens
[36] edat_lfse_04
[37] edat_lfse_22
[38] rd_p_persreg
[39] pat_ep_rtot

We also used data on the percentage of total employment in services, available until 2008[40], to integrate our series on sectoral employment from the regional labour market statistics.

A5.7 REGIONAL BUSINESS DEMOGRAPHY

All regional business demography statistics - birth and death rates of businesses, population of active enterprises and employees in the population of active enterprises, by sector[41] -, start from 2008 and are used to analyse the impact of the evolution of the economic landscape region by region over the more recent past.

A5.8 REGIONAL LABOUR MARKET STATISTICS

We used data on the percentage of long-term unemployed (12 months and more) in the active population by NUTS-2 region[42] and on the evolution of the composition of employment by sector by NUTS-2 region[43]. This data is available from 2008 on and therefore has been integrated with the series from the regional science and technology statistics. As the definition of sectors has changed, numbers exhibit some variation from one series to another. However, the simultaneous presence of 2008 values in both series allowed us to estimate a transformation coefficient (assumed fairly constant) that we used to build an integrated time series spanning 2000 to 2016. We focused on the share of employment in the tertiary sector in 2003 and on its evolution from 2003 to 2015.

A5.9 QUALITY OF GOVERNMENT INDEX

The World Bank provides a Worldwide Governance Indicators (WGI) yearly report at country level. However, for our analysis, a more granular evaluation would provide immense added value. This is why we turned to the European Quality of Government Index, developed by the Quality of Government Institute of Gothenburg University, since it is the most local set of such indicators available (NUTS-2 level). The index contains separate and integrated evaluations of a region's perceived corruption, along with its impartiality and quality in its provision of public services. Three editions of the survey have been published so far (in 2010, 2013 and 2017), and we relied on the first for our starting analysis.

A5.10 CAPITAL TO OUTPUT RATIO

For our analysis, it is crucial to grasp the local availability of physical capital in order to test more accurately each region's relative starting conditions and assess each region's performance accordingly. A measure of capital to output ratio is not available for NUTS-1 or NUTS-2 regions and therefore we had to construct one, given the data at our disposal.

AMECO provides data on the Net Capital Stock per country at 2010 prices, but not at purchasing power standards. The database also includes a price deflator, along with a capital/output ratio by country. We

[40] htec_emp_reg
[41] Considered for industry, construction and services sectors together and individually from EUROSTAT dataset [bd_hgnace2_r3].
[42] lfst_r_lfu2ltu
[43] lfst_r_lfe2en2

transformed the net capital stock per country to current prices using the deflator to make it consistent with the NUTS-2 level current price GDP data. We use the country-wide data to derive a NUTS-2 measure of the capital to output ratio by allocating by region the national stock of capital. The allocation is based on DG Regio statistics on gross fixed capital formation at NUTS-2 level. Therefore, we calculated an 'investment key' by NUTS-2 region, which is each region's share of the country's gross fixed capital formation. We then multiplied the national net stock of capital by this investment key, to obtain a NUTS-2-specific net capital stock, and divided the resulting figure by each NUTS-2 region's output. This provided us with an estimate of each region's capital-output ratio. Crucially, the sum of regional capital stock over the sum of regional output coincides with the national capital-output ratios contained in the AMECO database, reassuring us about the consistency of this procedure.

A5.11 DATA ON COHESION POLICY

We employed several variables related to Cohesion Policy programmes and funds. It was far from easy to obtain data, given our study at NUTS-2 level. In light of this, we did our best to complement different sources in order to test the robustness of our findings.

The first data source is the European Commission Regional Policy website (https://ec.europa.eu/regional_policy/en/atlas/), where up to four projects per NUTS-2 region are listed and explained in detail. These same projects can be found by accessing https://cohesiondata.ec.europa.eu/projects, where it is stated "*This is a list of representative projects funded by ESIF. It is not an exhaustive list of all projects*". We presume that the sample is indeed representative. From there we obtained information on the sectors each project refers to, the number and characteristics of beneficiaries (private, public, academic entities or non-research NGOs), the numbers and types of managing authorities (national or regional), the co-financing rate and budget, the duration of the project and the number of related themes.

The second data source we resorted to was the keep.eu dataset, which contains inter-regional programmes from the European Regional Development Fund (Interreg, Interreg IPA CBC and ENI CBC), with detailed information on several projects by NUTS-2 region, including the total budget, the part financed by the European Union, one to three priorities related to the projects from eleven areas (namely *environment*, *energy and infrastructure*, *evaluation*, *R&D and innovation*, *rural development*, *security*, *social inclusion*, *territorial and regional cohesion*, *tourism and culture*, *transport*, *urban development*), the duration of the project and the relevant Multiannual Financial Framework period.

Table 3 in Section 3 lists all cohesion project characteristics variables we use.

This study analyses the characteristics of cohesion policy projects that can contribute to successful outcomes. Our analysis is based on a literature survey, an econometric analysis and interviews with stakeholders. About two-dozen project characteristics are considered, and their association with economic growth is studied using a novel methodology. Based on the findings, the study concludes with recommendations for cohesion policy reform.

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