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Keywords
Erasmus; mobility; policy; higher education; development; trap; regional

JEL Codes
I23, R11, O18, H75

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Understanding Erasmus mobility in European regions: a quantile-based approach

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Declaration of competing interests: none.

1. Introduction

International student mobility is an important channel for disseminating and sharing knowledge, but it also proxies for the attractiveness of the places that benefit most from this phenomenon. The geography of discontent has highlighted the prominence and diffusion of regions that have lost (or never undertook) their growth convergence trajectory. The aim of this work is to offer a novel and multifaceted take on the geography of Erasmus mobility among European regions. Indeed, most of the research conducted on the Erasmus program focuses either on individuals or countries and it rarely considered factors that relate to regional development.

Given the considerable heterogeneity hidden in countries' territories, and the nature of the program, whose objectives are to "improve employability,…, stimulate curiosity and innovation,…, and build a sense of European belonging" (EC, 2021), it is of utmost importance to understand how are flows allocated across regions and whether the current allocation actually helps reaching these goals. Additionally, the recent enlargement in terms of budget and scope made to the program with the aim of stimulating more civic engagement and a more diffused adoption put additional pressure on carrying out a comprehensive policy evaluation. To do so, it is important to understand how Erasmus flows are allocated across European regions in terms of their characteristics.

Recently, National Agencies that manage the Erasmus program in the larger participating countries such as France, Italy, and Spain have started to promote a larger effort to become more proactive in the way the program unfolds in each territory. After recognizing the potential that it has in terms of positive human capital flows and cultural integration, their intention is to improve the civic engagement of local territories and thus, to widen the impact of the program. This is certainly a great step toward an empowerment of the program and it can benefit from a better understanding of the driving forces of its transregional flows.

The recent literature on economic geography introduced and deepened the concept of "left-behind places" suggesting the presence of an wide-spread polarization in political and economic terms. If similar evidence emerges when looking at the Erasmus program this could be a worrisome signal of a reduced potential. Higher education institutions (HEIs) play a key role in regional development and they can also be powerful leaders in the process. For this reasons, they can be powerful hubs that attract students and benefit from their human capital flows, possibly triggering down the effects across the region. Unfortunately, the results of this analysis suggests that current flows are concentrated toward urban, competitive and well-governed destinations. Further, exploiting the indicator built in Diemer et al. (2022) reporting on the development trap status of regions, we highlight how this negatively explains the performances of regions in the central and bottom attractiveness quantiles. This suggests that places which are not attractive in Erasmus terms tend also to be disadvantaged due to their poor growth trajectories.

All these results give a rather non-optimal picture of students' flows allocation across Europe, which could on the contrary be used in a much more proactive way, also providing a better alignment with the program goals. Such an action would imply moving from the current *laissez-faire* policy in terms of Erasmus agreement conception to a more "nudged" one. The current distribution favors already competitive regions and HEIs, thus reinforcing likely polarizing dynamics that are eroding the cohesion of the EU. The introduction of gentle conditionalities in the budgeting for Erasmus agreements and other policy interventions can be imagined to improve the currently detected situation.

The paper proceeds as follows. Section 2 contextualizes the objects of the study, it presents some descriptive evidence as further motivation, and it reports the most relevant pieces of literature on the topics. Section 3 conceptualizes and explains the envisioned empirical approach, while Section 4 present the results and Section 5 discuss them. Finally, Section 6 proposes the concluding remarks and policy considerations.

2. Background and context

a. Erasmus+ mobility and its cohesion role

In terms of knowledge flows promotion, one of the main tools that the European Union has deployed is the Erasmus program. Created in 1987 by the Directorate of General Education and Culture of the European Commission, it aims to increase European mobility for young generations and ultimately, increase the feeling of Europeanization. Its main action consists of the student exchange program among HEIs. In 2011, more than 2,000 universities from the European continent were participating. Now, after roughly two decades of continuously increasing participation trends, the program reached a quasi-stationary level. The Erasmus program is not only an important component of many individuals' career paths, but also of regional dynamics. Indeed, personal career development and the improvement of geographical and social cohesion have always been the main tenets of the program. Finally, the financing of this mobility scheme is a considerable chapter of European budgeting, with 14.7 billion euros invested from 2014 to 2020, and the decision to double this amount for the subsequent period 2021-2027.

For the period of reference, Erasmus+ replaced the previous Erasmus program and it widened the scope of application including education, training, youth, and sports-related mobility initiatives. With a budget of 14.7 bn euros, it involved in its activity 3.7% of the youth population in Europe, which correspond to more than 3 million persons. This renewed framework revolves around three key actions: (1) learning mobility for individuals, (2) cooperation for innovation and the exchange of good practices, and (3) support for policy reform. Further, in 2017, the European Commission (2017) has launched an initiative aimed at giving birth to a European Education Area by 2025 that should "make mobility a reality for all". Clearly, through these actions, the European Commission strives to promote knowledge flows, cohesion, and the acknowledgement of left-behind places.

b. Stylized facts on Erasmus and international students' flows

Most of the research on the topic has been produced in the first fifteen years of the 2000s and it helped considerably in mapping and understanding the dimensions of the phenomenon. Nevertheless, it struggled more in grasping the generative mechanisms behind the phenomenon and its likely interrelations with other interregional networks of interest. In terms of methodology, the two most applied approaches in the literature are gravity models and network analysis. Using the former, scholars have tried to individuate the determinants of students' mobility taking into consideration both the characteristics of origin and destination HEIs/regions and their distance. Van Bouwel and Veugelers (2013) used aggregate national-level data for 31 countries focusing on the quality dimension. The idea was to determine whether students' choices are guided by quality considerations or not. Accordingly, it does have a significant and positive effect on both size and direction of students' flows. Other studies that had previously focused on the quality dimension of HEI systems are Thissen and Ederveen (2008) and Rodríguez-González et al. (2011). The latter finds that despite funding, cost of living and distance are significant factors in explaining students' flows. Further, they detect that the share of highly educated people is a positive and significant factor. Also, they theorize the presence of time dynamics leading to positive feedback loops, meaning that there could be imitation mechanisms at stake, as migration theories suggest. Finally, Zheng (2014) establishes that factors like home country wealth and demographics, relative exchange rate, home country imports from UK, historic/linguistic links, and government preferential policies are significant, but they have heterogenous impacts between developed and developing countries.

From a network analysis perspective, Derzsi et al. (2011) carries out a rather technical analysis of the topological properties of the Erasmus network. Using data at university-level, they find that despite the dimension of the network, it is not scale-free, and they suspect also that universities follow exponential size-distributions. This also implies that the number of links that a university establishes is proportional with the size of the university, making this again a key control factor. Using a longer time perspective, from 2007 to 2014, Breznik and Skrbinjek (2020) categorize countries according to the outbound and inbound mobilities they create groups of "good/bad" senders or receivers. Countries such as Spain, Austria, Poland and Switzerland turn out to be balanced, as well as smaller countries like Luxembourg, Malta, and Lithuania. Also, they find that there exists central-periphery dynamics, with Spain that receives many students from high-income countries, central European countries that mostly exchange between each other, and Croatia and Slovakia staying on the border of these flows. Finally, an interesting and complementary approach can be found in Naidoo (2007), where the author applies time-series analysis to data tracking UK flows of international students for the period 1985-2003 established similar findings to the ones in Van Bouwel and Veugelers (2013).

c. Development Traps and why considering other regional characteristics

The influence of path-dependence[1] and spatial self-reinforcing mechanisms has been known for a while to economic geographers (Marino & Trapasso, 2009), but the renewed attention, the increasing availability of regional-level datasets, and the need for an observational level that makes easier to intervene with policies brought to a huge deal of relevant studies in the field. Among these analyses, some attracted the attention of many practitioners, such as academics as policy-makers, for their capability to grasp the past and current regional dynamics and explain them. For instance, this is the case of Rodríguez-Pose (2018), where the author warns about the emergence of a two-tier system, where few, vibrant and competitive super-regions accumulate economic and political power to the detriment of an increasing number of so-called left-behind places.

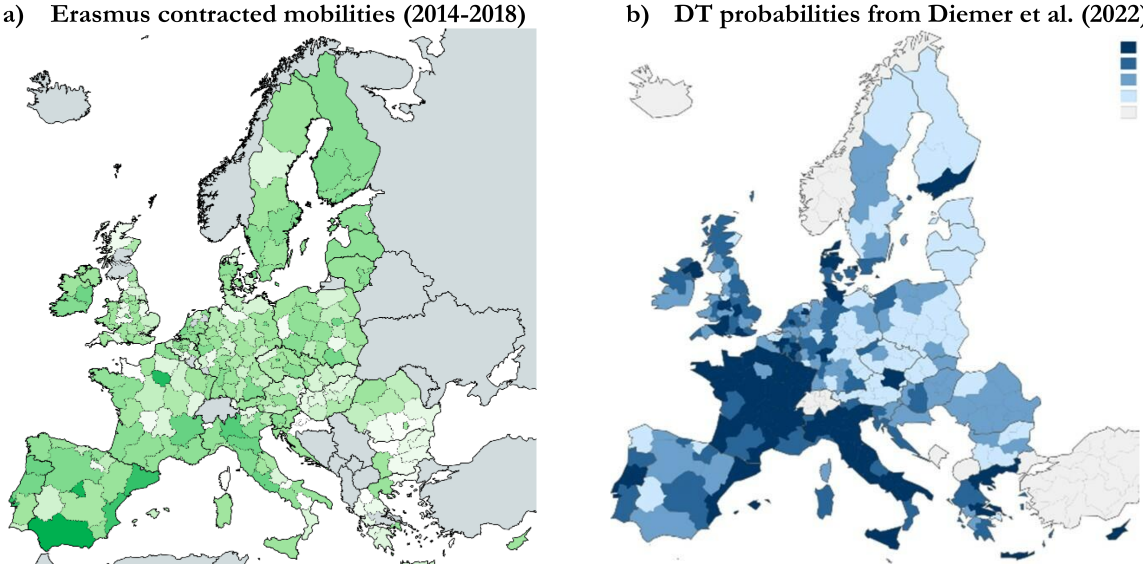
Adding depth to this, there exist regions that once constituted the rural and old industrial European texture, which are now either in a development trap or they are at high risk of falling into it. This adds a third layer to the two-tier grouping envisioned by Rodríguez-Pose (2018: between the two extremes, there is a group of regions that struggles to find promising development trajectories and to attract policy interest. Contrary to expectations, trapped regions are not only middle-income territories, but they exhibit quite heterogenous profiles. As largely detailed in Diemer et al. (2022), DTs may take place for a variety of mechanisms and this forces to enlarge the vision to correctly understand the driving forces behind it. For instance, some regions may have lost their industrial vocation because of low competitiveness, but some others may have done so because of low quality institutions.

In the context of Erasmus attractiveness, checking whether regions that are not in a DT are advantaged relatively to those that are in a DT would point toward yet another self-reinforcing mechanism that polarizes the flows toward a reduced set of desired regions, while letting the others at the margins. At least from a visual perspective, this phenomenon seems to be present quite clearly in Europe (Figure 1). The fact that HEIs attempt to close agreements with the most renewed ones to gain in appeal should not come to a surprise. Nevertheless, not governing this tendency over time limits considerably the potential of the Erasmus program, which could not be limited to a simple and straight study mobility, but could also be starred with more integration in the hosting territories, performing activities that can benefit both sides. This is even more relevant for areas that are rural or at the margins of the Europeanization process, which thanks to the Erasmus program could encounter different realities and receive different stimuli.

[1] Interestingly, the phenomenon is far from being limited to this and path-dependence characterizes societies as a whole, but also the way HEIs interact with their surrounding region (Chatterton & Goddard, 2000).

Figure 1. Spatial overlapping between the number of contracted mobilities and the probability to fall into a development trap.

a) Erasmus contracted mobilities (2014-2018) **b) DT probabilities from Diemer et al. (2022)**



Given these tendencies and the apparent overlapping between a reduced capacity to attract Erasmus students and the probability of being in a DT, it becomes relevant to deepen our understanding in terms of other potential characteristics that could be linked to the regional performance and competitiveness. Particularly, it is hard to imagine that the same processes apply to the more than 250 NUTS-2 regions that are part of the Erasmus program. On the contrary, we expect bad performances to be driven and characterized by different regional identikits. Only through this understanding, it is possible to evaluate the need and the channels for intervention in the allocation of Erasmus mobilities, which would imply using HEIs as active tools for reinforcing a more balanced regional development (Goddard & Puukka, 2008).

3. Modeling flows to heterogeneously characterized European regions

a. Data and variables

The data comes from a variety of trusted sources. First, the focus variable derivates from the official data of the Erasmus Italian National Agency, INDIRE, and it tracks all the mobilities contracted at NUTS-2 level for the period 2014-2018.[2] An additional variable that stems from this dataset acts as key control variable in the analysis, the number of HEIs enrolled in the Erasmus program. Then, to characterize the different regions' profiles we merge data from multiple origins. Precisely, from Eurostat, we retrieved data on the urban-rural status, the population, the number of tourism arrivals, and the capital city status. To track the DT status or the risk of falling into it, we directly referred to Diemer et al. (2022). Further, we added data for the RCI and its sub-components relative to 2016 from the European Commission website (Annoni et al., 2017). Other data from European institutions is the Cohesion Data that tracks paid and utilized fundings for all regions under the European Regional Development scheme and the European Social Fund.[3] Finally, we exploited information

[2] Despite larger time spans may have been auspicable, in 2014 a new and harmonized data collection system was implemented, and we only consider data up to 2018 to have the entirety of mobilities formally closed.

[3] The inclusion of these variables has the precise aim to understand whether the orientation of funding schemes is related to specific regions performances in terms of Erasmus participation, which constitute a significant investment chapter for the EU and could be coupled with other schemes. If so, the finding would constitute a good sign of effective and proactive use of the funding schemes provisions.

on the regional governments' quality from Charron, Dijkstra and Lapuente (2015). In the appendix, we report the summary statistics for the variables under study (Table A1).

b. Modeling choice

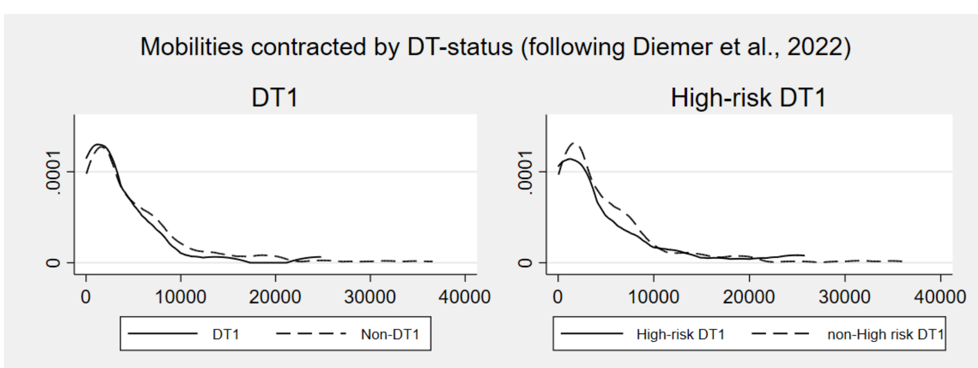
A key characteristic of the study is the nature of the dependent variable, which consists of the number of students that each year arrive in a given NUTS-2 region. By nature, this is a counting variable and this already prompts the evaluation of alternative modeling choice, other than the standard Ordinary Least Squares (OLS) model. Given the distribution under consideration, a Poisson estimator could be preferrable, as it accounts for the discrete and skewed nature of the process under consideration.

Nevertheless, it is largely expectable that the performances of top attractive regions are not driven by the same processes as for less attractive ones. For this reason, we employ a quantile-based approach, specifically formulated for the counting nature of the dependent variable (Miranda, 2007). For instance, Table 1 shows the average number of mobilities attracted in the regions composing our sample according to the development trap classification proposed in Diemer et al. (2022). What emerges quite straightforwardly is the mixed signals that are transmitted focusing exclusively on averages in this specific context. Indeed, development-trapped regions do not seem to perform robustly better or worse in attractiveness, as proxied by the number of activated mobilities, if compared to non-trapped regions. On the contrary, the averages tend to be very close.

Table 1 – Average count of Erasmus+ mobilities by Development Trap status (following Diemer et al., 2022)

	DT	High risk DT
No	800.01	796.96
Yes	795.04	814.82
Whole sample	799.6	

Appraised that the simple analysis of averages is not informative enough in this context, Graph N below shows the complete distribution of our variable of interest, according to the DT status of the regions. Again, it is not hard to see that there is not any apparent dominance that holds for the full distribution. Contrarily, there are considerable up and downs that make the two curves cross. Nevertheless, what emerges clearly, is the longer right-tail of the non-trapped distributions, which suggests that non-trapped regions are much more likely to become positive outliers in contracting Erasmus+ mobilities.



Given the above, among the several perks that quantile models offer, the possibility to estimate a conditional function for each point of interest of the conditional distribution of the dependent variable, as expressed by the chosen covariates, is probably the biggest one. In addition, the variations in the estimated coefficients along the distribution are interpretable as the result of systematic differences among regions. Starting from the typical quantile regression model:

$$y_i = x_i'\beta_0 + u_{\theta i} \qquad \text{with} \qquad x_i'\beta_0 = quant_\theta(y_i|x_i) \qquad (1)$$

Where y_i is the dependent variable, x a vector of explanatory variables, β is the vector of estimation parameter, and *u* corresponds to the vector of residuals. Finally, $quant_\theta(y_i|x_i)$ is the θ^{th} conditional quantile of y_i given x_i. This is solved through a minimization problem that determines the final set of parameter coefficients. To increase the fit of our modeling choice, we opt for the estimator developed in Miranda (2007), which overcomes the issue coming from the discreteness nature of the variable of interest. This leads to the used specification, which is:

$$quant_\theta(y_i|x_i) = \alpha + \exp\,[x_i'\beta_\theta] \qquad (2)$$

Where y_i corresponds to the number of mobilities contracted in each NUTS-2 region *i*, and the vector of covariates contains the following variables according to the specification used (Table 2).

Table 2. Detail of the explanatory variables included in each specification.

Specification	Variables
1) Baseline model	Urban-rural category, population mean, number of tourism arrivals, number of HEIs, capital city status, DT status, high DT risk status
2) RCI and sub-components	Regional competitiveness index And separately, its sub-components: basic, efficiency, innovation
3) European Funding	Separately, European Regional Development Funds, and European Social Fund, both in their two versions: financed and implemented.
4) Quality of Government	The quality of government index And separately, its sub-components
A) Robustness checks	Instead of urban-rural category, population density

Further, all non-categorical variables are estimated in logarithmic form both to accommodate their skewed nature and to facilitate the coefficient interpretations as elasticities. Finally, to account for possible time- and geographic-specific dynamics, we include both year and country fixed effects. To provide useful benchmarking when looking at quantile estimates, we also run the estimates using the OLS approach, including the same fixed effects and clustering the errors at regional-level, and using the Poisson estimator.

4. Empirical evidence

a. Baseline model

Starting to scrutinize the findings from the baseline models allows for a larger consideration of the explanatory variables taken into consideration. Indeed, only in this sub-section, we report almost all the covariates included in the models, while in the next ones, for the sake of brevity, we will focus on those that pertains directly to each extension.[4] A first methodological remark is due when looking at the estimated coefficients across the different estimators. Indeed, if for instance the relationship between attractiveness and rurality would have been

[4] The interested reader can find all the estimations in the Appendix.

captured also with standard estimators, more nuanced relationships that only affect part of the distribution would have been disregarded as irrelevant.

Generally, the baseline model shows how rural regions are penalized in terms of attractiveness and this holds for the whole distribution. On the contrary, it is interesting to notice how factors such as the number of incoming tourists and the DT statuses are particularly well-suited to explain the variations in the lower part of the distribution. In a similar but opposite vein, the capital city statuses does so for the upper part of the distribution, where the best performing regions are located.

Table 3. Estimated coefficients for the baseline model.

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.330***	-0.051***	-0.0340***	-0.0405***	-0.0413***	-0.0411***	-0.0333***
	(0.110)	(0.0184)	(0.0111)	(0.0108)	(0.00997)	(0.00867)	(0.00770)
Tourism arrivals	0.232	0.0335	0.0528***	0.0613***	0.0383***	0.0223**	0.0134
	(0.141)	(0.0254)	(0.0190)	(0.0133)	(0.0140)	(0.0113)	(0.00822)
Capital city	0.184	0.0175	-0.00288	0.0170	0.0252*	0.0318**	0.0403***
	(0.179)	(0.0284)	(0.0182)	(0.0158)	(0.0142)	(0.0136)	(0.0111)
DT1	-0.207	-0.0310	-0.0276	-0.0459**	-0.0442**	-0.0164	0.0153
	(0.201)	(0.0330)	(0.0193)	(0.0194)	(0.0225)	(0.0206)	(0.0177)
HighriskDT1	-0.197	-0.0401	-0.0657***	-0.0545***	-0.0291*	-0.00781	-0.00936
	(0.139)	(0.0247)	(0.0166)	(0.0163)	(0.0155)	(0.0123)	(0.00966)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients relative to our control variables, population and number of HEIs, and relative to the country and year fixed effects.

b. RCI and its sub-dimensions: basic, efficiency, and innovation

Given the above findings relative to the basic set of regional features and which are largely confirmed by these further estimates, we now shift our attention to the first extension of the analysis: the regional competitiveness index and its sub-components. Particularly, we see that both the overall index and the "efficiency" dimension, which tracks the market size, the labor market quality and the level of higher education of regions, are relevant in explaining variation across the whole distribution. Contrarily, the "basic" dimension, which looks at institutions quality, macroeconomic stability, infrastructure, health and education, explains better the performances of regions in the right part of the distribution. Finally and curiously, innovation, as proxied by technological readiness, business sophistication and innovative output, well explain the variations among top and bottom performers but not for quantile .25 and only marginally for the central quantile.

In these estimations, we stress how albeit with different magnitudes, the majority of this explanatory factors are relevant in tracking the variations in the number of mobilities contracted, but the basic dimension, which may be taken for granted easily, has a monotonically increasing and positive relation across quantiles.

Table 4. Estimated coefficients for the RCI extension.

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
RCI	0.236***	0.0530**	0.0590**	0.0401**	0.0433***	0.0466***	0.0467***
	(0.0906)	(0.0210)	(0.0297)	(0.0159)	(0.0129)	(0.00949)	(0.00792)
Basic	0.0527	0.0112	-0.0161	0.00776	0.0106**	0.0147***	0.0163***
	(0.0360)	(0.00719)	(0.0116)	(0.00582)	(0.00456)	(0.00422)	(0.00337)
Efficiency	0.774***	0.128***	0.0721**	0.0911***	0.111***	0.114***	0.123***
	(0.287)	(0.0477)	(0.0332)	(0.0294)	(0.0276)	(0.0247)	(0.0212)
Innovation	0.105	0.0278*	0.139**	0.0403	0.0192*	0.0209***	0.0225***
	(0.0655)	(0.0162)	(0.0693)	(0.0377)	(0.0101)	(0.00619)	(0.00526)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients of the baseline model and relative to the country and year fixed effects. We stress how each line of the above estimates are obtained separately.

c. European funding reception

As anticipated in the background literature above, we were interested in establishing a possible link between the reception of European funding and the actual performance in terms of Erasmus attractiveness to understand whether one of the two parts (the EU and regions) were using the funding in a strategic way that could couple with the Erasmus mobility provisions, which are already an important part of EU budgeting. Nevertheless, both the standard econometric estimators and the quantile ones, do not show compelling results. Apparently, weak and negative results emerge only for regions whose European Social Funding requests get financed. Even if we could suppose that among those regions, those asking for financing in terms of social funding are slightly lagging behind in terms of Erasmus attractiveness, no systematical relationship emerges.

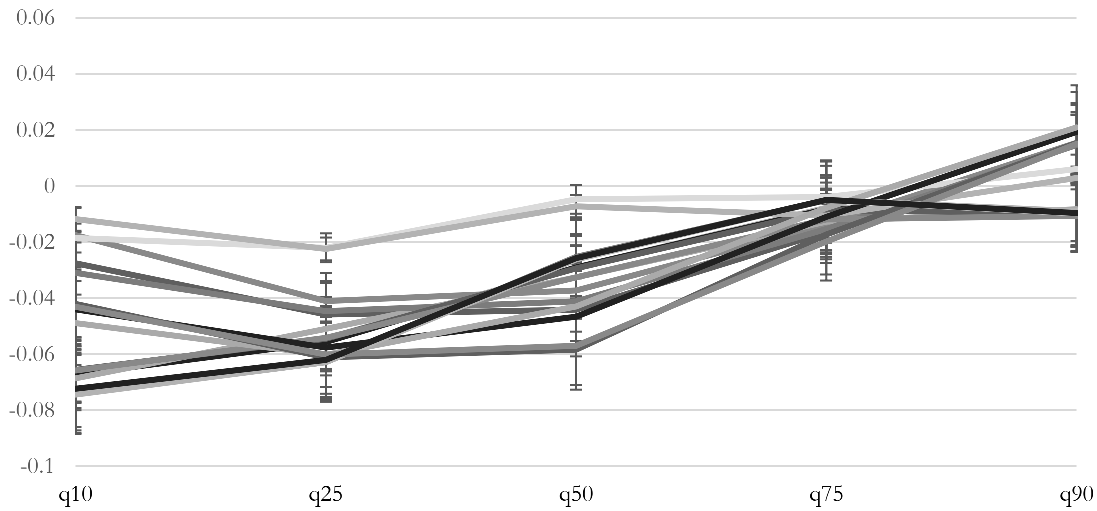
Table 5. Estimated coefficients for the EU funding model.

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
ERDF paid	0.00162	0.000264	0.000138	0.000275	0.000332	0.000314	0.000371
	(0.00154)	(0.000244)	(0.000685)	(0.000559)	(0.000549)	(0.000493)	(0.000462)
ERDF financed	-0.0341	-0.00292	0.00910*	0.00301	-0.00454	-0.00724	-0.00293
	(0.0370)	(0.00608)	(0.00493)	(0.00440)	(0.00453)	(0.00471)	(0.00488)
ESF paid	-0.000134	6.28e-05	0.000211	0.000125	-6.75e-05	2.97e-06	5.00e-05
	(0.00130)	(0.000238)	(0.000742)	(0.000600)	(0.000571)	(0.000513)	(0.000454)
ESF financed	-0.105**	-0.0143**	-0.0148*	-0.00923	-0.00996**	-0.00892**	-0.00841**
	(0.0415)	(0.00675)	(0.00756)	(0.00561)	(0.00507)	(0.00418)	(0.00398)
Observations	850						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients of the baseline model and relative to the country and year fixed effects. We stress how each line of the above estimates are obtained separately.

Despite the non-significance of the vast majority of this last battery of results, the re-estimation of the model also for these covariates allowed to further test the robustness of one of our main findings: the link between development-trapped regions and those who are able to contract less Erasmus mobilities. Up to now, the results show a generally negative and robust relationship between the DT statuses and number of contracted Erasmus mobilities among less attractive regions and a non-significant one for the right part of the distribution (see overlaid graph 1). In the next sub-section, we will see how taking into consideration the quality of government affects the situation under study.

Graph 1. Estimated coefficients plot for the DT and risk of DT variables across all estimations.



This constitutes already quite a big finding as it appears undeniable that the DT status is particularly well suited in explaining part of the low performance of regions at the bottom of the distribution. Indeed, across several and different specifications, we find results that are in a very close range.

d. Quality of government

The last model extension looks at how the quality of local governments is related to regional attractiveness in terms of Erasmus. Recalling that first for students to pick a destination, HEIs need to conceive exchange agreement and not seldomly, local institutions have a role in this. Also, the performance and reputation of HEIs is subject to the influence of local authorities. Indeed, both the standard estimators and the quantile ones confirm this intuition and show a clear positive relationship between the two variables, which also holds across the distribution. This can be stated also for two of the three sub-components of the EQI score, namely quality and impartiality.

Table 6. Estimated coefficients for the baseline model.

VARIABLES	**Number of contracted E+ mobilities**						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
EQI score	0.266***	0.0728***	0.0820***	0.0749***	0.0758***	0.0768***	0.0795***
	(0.0465)	(0.0175)	(0.0154)	(0.0131)	(0.0130)	(0.0123)	(0.0104)
DT	-0.0975	0.000467	0.0435**	0.0171	0.000162	0.00815	0.0243**
	(0.198)	(0.0326)	(0.0202)	(0.0190)	(0.0150)	(0.0128)	(0.0117)
High risk of DT	0.00447	0.00990	-0.00361	0.0294**	0.0164	0.0146	0.00681
	(0.128)	(0.0225)	(0.0237)	(0.0137)	(0.0113)	(0.00940)	(0.00868)
Quality	0.185***	0.0326***	0.0482	0.0241***	0.0293***	0.0341***	0.0361***
	(0.0613)	(0.0120)	(0.0649)	(0.00871)	(0.00480)	(0.00454)	(0.00413)
DT	-0.123	-0.00860	0.0483*	0.00916	-0.0121	-0.00605	0.00865
	(0.195)	(0.0319)	(0.0254)	(0.0180)	(0.0139)	(0.0119)	(0.0123)
High risk of DT	0.0328	0.00849	0.00198	0.0236*	0.0138	0.0173*	0.00930
	(0.137)	(0.0240)	(0.0205)	(0.0142)	(0.0117)	(0.00915)	(0.00876)
Impartiality	0.221***	0.0746***	0.0763***	0.0801***	0.0842***	0.0854***	0.0857***
	(0.0457)	(0.0172)	(0.0152)	(0.0148)	(0.0152)	(0.0174)	(0.0160)
DT	-0.109	-0.00162	0.0377*	0.0187	0.000753	0.00620	0.0194
	(0.199)	(0.0328)	(0.0199)	(0.0187)	(0.0147)	(0.0130)	(0.0120)
High risk of DT	-0.0505	-0.00318	-0.0131	0.00992	0.00742	0.0105	0.00160

	(0.136)	(0.0237)	(0.0211)	(0.0139)	(0.0117)	(0.00961)	(0.00873)
Corruption	0.0788	0.0134	-0.0196	0.0121*	0.0168**	0.0183**	0.0152**
	(0.0577)	(0.0123)	(0.0142)	(0.00632)	(0.00741)	(0.00766)	(0.00725)
DT	-0.122	-0.00893	0.0436**	0.0132	-0.0110	-0.00787	0.00611
	(0.197)	(0.0320)	(0.0199)	(0.0180)	(0.0138)	(0.0119)	(0.0124)
High risk of DT	-0.0358	-0.00293	-0.0105	0.0101	0.00463	0.0115	0.00452
	(0.133)	(0.0231)	(0.0186)	(0.0145)	(0.0121)	(0.00981)	(0.00900)
Observations	870						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients of the baseline model and relative to the country and year fixed effects. We stress how each line of the above estimates are obtained separately.

Looking at the different sub-components, we notice how corruption control is not the main explanatory factor for our dependent variable. Also, we stress how the components' coefficients have larger estimates for the right part of the distribution, implying that these factors are more present in well-performing regions from an Erasmus perspective. Quite surprisingly, the inclusion of the government quality in the information set affects drastically the estimation of the DT variable, which now turns to be either non-significant or positive and it exhibits larger coefficients for the bottom part of the distribution. Although unexpected, this finding is easily interpretable and it suggests that at least for Erasmus attractiveness, DT regions, or those at risk of it, if well-governed are still powerful receiving hubs. Controlling for government quality seems to lessen the "ruralness penalty" especially across Erasmus-attractive regions (see Table A2-A18). All of this holds also in the robustness checks.

5. Discussion and implications

The above empirical approach led to two very relevant results. First, we stress how without controlling for government quality, while standard indicators such as the RCI relates positively with E+ contracted mobilities, the DT variable consistently reports negative and significant coefficients for the center and bottom of the distribution. If controlled for, government quality is a key feature of regions that has remarkably strong influence in enhancing particular aspects, such as higher education, in trapped regions. Second, thanks to quantile regression, we identified how the regional profile changes between Erasmus-attractive areas and those that are not. Particularly, we highlighted how one European policy, the Erasmus program, tend to benefit mostly urban regions, possibly hosting the capital city, and not close to a development trap. On the contrary, other relevant chapters of the EU policy, like ERDF and ESF, do not appear particularly related to the Erasmus program in terms of allocation.

Regarding the first matter, local-level indicators of competitiveness and good institutions have been known to proxy for positive attractiveness of a territory, especially when looking at skilled migration (Nifo & Vecchione, 2013). This is understandable but as it is, it may strongly hinder the potential of the Erasmus policy, whose aims are also to incentivize the feeling of Europeanness among young individuals. As such, the polarization of the flows that emerges from this study leads to the exclusion of places that are already excluded from multiple aspects. Apparently one of the few way out for these places to still be competitive in terms of Erasmus attractiveness is being a well-known touristic destination.

For the second matter, a re-allocation of the funding to create more symbiotic energies may be worth to be taken into account. In this, an increase of the weight toward more disadvantaged or less developed areas would be certainly due (Hermans et al., 2022). Nevertheless, the role of institutions, or of some kind of direct supervision with clearly-set and measurable objectives may be necessary to avoid possible inconsequential investment and improve coordination.

Generally, the picture looks rather polarized with a considerable group of regions that are somehow at the margins of the Erasmus program and that tend to lag behind in several aspects. As well noted in Pike et al.

(2023), the term "left-behind places" shall be looked at as a wide and multi-faceted concept which entails different dimensions of the society. Meaning that not only can they be identified in terms of poor economic performance or political discontent, but also through more comprehensive approaches that integrate views on higher education, the role of institutions, cultural norms and past trajectories. Our study highlights the presence of considerable asymmetries, but also of possible areas of intervention. For instance, investment in HEIs can prove to be a powerful strategy. Although their capability to support regional needs is conditioned by several factors specific to their relation with each region (Chatterton & Goddard, 2000), efforts to improve their embeddedness through more local involvement might benefit regional development (Raagma & Keerberg, 2017). In a similar fashion, higher education growth has shown to positively affect regional economic performance with stronger effects on less wealthy regions (Canal Domínguez, 2021).

6. Concluding remarks

The Erasmus program has a long and successful history and thanks to this, it keeps being a reference point for the European integration policy. The recent refinancing that almost doubled its allotment increases even more its transformative and ameliorative potential. In total understanding with the situation, the most important National Agencies dealing with the program have put their effort in understanding how it can be better orientated and integrated to have a wider impact on society and regions, especially more disadvantaged ones. In a first endeavor in this direction and to promote the debate on the topic, we test the alignment of Erasmus mobilities with characteristics that emerged as relevant for a region to be attractive in the regional economic literature.

Doing so, with the aim of considering as much sides as possible, we developed a series of estimations that separately consider the relationship that regional Erasmus attractiveness has with the following aspects: the regional competitiveness index (RCI) and its sub-components, the reception and utilization of EU funding schemes, the quality of government and its distinct constituents. Further, in all the estimations, two variables tracking the growth trajectory of the regions allow to capture possible polarizing dynamics. In addition to this, we also tailor our choice of estimation technique and rely upon a quantile regression approach, which instead of returning the conditional mean estimates, it tracks their coefficient all along the distribution.

Given the multidimensional nature of the study, the findings are several. First, we show how rural regions are generally penalized in terms of Erasmus attractiveness, with urban centers receiving all the spotlight when agreements among higher education institutions (HEIs) are conceived. Then, thanks to the quantile regression approach we highlight how the flows are explainable by different variables according to each regional performance. For instance, less performing regions' flows are more associated with tourism arrivals, while those of more performing regions are better explained by the capital city status, or by indexes related to the quality of local governments. Second, we exploit the indicator developed in Diemer et al. (2022) that tracks the status of regions in terms of being either in a development trap (DT) or at high risk of falling into it. This choice returns compelling results as for a considerable number of estimations, the DT status is (negatively) related to low-performing regions. Such a finding is alarming as regions that are non-attractive in terms of international students' mobility are also in a bad development trajectory. Connecting with the rich findings of the recent economic geography literature, this can have several indirect effects on the cohesion of the European Union. Further, what emerges is that the quality of government changes drastically the situation and makes these regions much more attractive.

Concluding, the aforementioned findings present suboptimal outcomes regarding the allocation of student flows across Europe. Alternatively, these outcomes may be leveraged proactively to enhance alignment with program goals. In this context, it may be relevant to transition from the current *laissez-faire* policy in Erasmus agreement conception to a more nudged approach. The present allocation mechanism favors regions and higher education institutions (HEIs) that are already competitive, consequently reinforcing polarizing dynamics that impair EU cohesion. Gentle conditionalities and policy interventions may be introduced to ameliorate the existing situation.

a. Policy recommendations

Before starting with the policy recommendations, we should first ask whether this is a desirable allocation? If not, then some actions can be considered to amend the current situation. First and foremost, more academic and policy attention could be devoted to these flows with the aim of understanding their actual impact on societies as a whole. Secondly, a re-orientation of the Erasmus program, and more generally of the Cohesion policy, could be evaluated with a particular focus on "left-behind" places. In this, we stress how solutions should be designed carefully and on a place-based basis. Further, their implementation should be attentively tracked and coordinated. Even if a broad push toward more decentralization of powers has proven to be connected to lower social exclusion, also regardless of the quality of local government (Tselios & Rodríguez-Pose, 2022), it would be also a priority to improve their condition with the aim of enabling regions to appropriate the full decentralizations' economic returns (Rodríguez-Pose & Muštra, 2022).

Also, when identifying these territories, it shall be reminded how multi-faceted their negative situation might be in terms of different social and economic indicators. More generally, HEIs should be given a more proactive role and be also used as enabling tools for regional policy (both in terms of internal development and of foreign/transregional affairs). Other studies have already stressed the increasing relevance of HEIs in a knowledge-based economy, which also could be "entrepreneurial" in the specific sense of supporting the local innovation system and aligned with the government policy context (OECD-EC, 2018). Although challenging, this approach can be pursued also under frameworks such as the knowledge triangle (Unger et al., 2018). Effort to improve the HEI proactivity and breadth in regional development might be a further beneficial step.

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7. Online Appendix

a. Additional tables

Table A1 – Descriptive statistics

Variable	Mean	SD	Skewness	Kurtosis	N
Number of contracted E+ mobilities	794.43	1089.87	3.28	16.06	1115
Population	1,866,022	1,563,266	2.89	15.16	
Population density	500.42	1280.09	5.68	40.08	
Ruralness index	1.94	0.59	-0.18	1.99	
Tourism arrivals	2145.1	2177.19	3.45	21.85	
Capital city	0.11	0.31	2.53	7.41	
Number of HEIs	10.4	21.12	5.12	33.24	
DT	0.06	0.24	3.6	14	
High risk DT	0.15	0.36	1.93	4.74	
RCI	54.51	26.08	-0.33	2.14	
RCI-basic	62.83	26.83	-0.81	2.67	
RCI-efficiency	62.11	18.29	-0.21	2.31	
RCI-innovation	50.19	22.84	-0.21	2.14	
ESF – financed	15,400,000	26,000,000	5.29	49.2	850
ERDF - financed	31,500,000	55,600,000	3.59	21.28	
ESF - paid	15,400,000	32,200,000	5.21	47.81	
ERDF - paid	31,500,000	70,500,000	4.31	26.3	
EQI score	2.27	0.97	-0.37	2.14	870
EQI-quality	2.59	0.97	-0.61	2.58	
EQI-impartiality	2.78	0.98	-0.44	2.34	
EQI-corruption	2.55	0.97	-0.25	2.22	

b. Robustness checks with population density instead of the urban-rural categorization in the baseline model

i. Baseline

Table A2. Estimated coefficients for the baseline model – robustness version

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Population density	0.197***	0.0290***	0.0313***	0.0295***	0.0246***	0.0188***	0.0150***
	(0.0676)	(0.0112)	(0.00797)	(0.00661)	(0.00626)	(0.00507)	(0.00400)
Tourism arrivals	0.246*	0.0352	0.0618***	0.0664***	0.0377***	0.0189*	0.0142*
	(0.136)	(0.0244)	(0.0184)	(0.0138)	(0.0138)	(0.0110)	(0.00815)
Capital city	0.0418	-0.000942	-0.0317	-0.0106	0.00602	0.0276*	0.0341***
	(0.201)	(0.0314)	(0.0200)	(0.0199)	(0.0174)	(0.0160)	(0.0125)
DT1	-0.190	-0.0284	-0.0145	-0.0326*	-0.0380*	-0.0147	0.0164
	(0.188)	(0.0312)	(0.0191)	(0.0184)	(0.0207)	(0.0208)	(0.0171)
HighriskDT1	-0.206	-0.0418*	-0.0704***	-0.0593***	-0.0348**	-0.00891	-0.00618
	(0.141)	(0.0251)	(0.0162)	(0.0161)	(0.0154)	(0.0132)	(0.00998)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients relative to our control variables, population and number of HEIs, and relative to the country and year fixed effects.

ii. RCI and its sub-dimensions

Table A3. Estimated coefficients for the RCI extension – robustness version

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
RCI	0.241***	0.0547***	0.0440*	0.0396***	0.0452***	0.0469***	0.0459***
	(0.0904)	(0.0211)	(0.0251)	(0.0146)	(0.0129)	(0.00931)	(0.00767)
Basic	0.0512	0.0112	-0.0168	0.00790	0.0110**	0.0145***	0.0161***
	(0.0373)	(0.00744)	(0.0120)	(0.00579)	(0.00437)	(0.00422)	(0.00328)
Efficiency	0.768***	0.129***	0.0390	0.0804***	0.110***	0.113***	0.119***
	(0.277)	(0.0466)	(0.0327)	(0.0275)	(0.0268)	(0.0247)	(0.0210)
Innovation	0.118*	0.0304*	0.125*	0.0404	0.0246**	0.0222***	0.0236***
	(0.0690)	(0.0172)	(0.0678)	(0.0344)	(0.0123)	(0.00626)	(0.00516)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients of the baseline model and relative to the country and year fixed effects. We stress how each line of the above estimates are obtained separately.

iii. European Funding

Table A4. Estimated coefficients for the EU funding model – robustness version

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
ERDF paid	0.00193	0.000308	0.000121	0.000318	0.000393	0.000369	0.000363
	(0.00148)	(0.000238)	(0.000642)	(0.000536)	(0.000542)	(0.000507)	(0.000459)
ERDF financed	-0.0190	-0.00122	0.0113**	0.00450	-0.00308	-0.00659	-0.00196
	(0.0379)	(0.00618)	(0.00500)	(0.00422)	(0.00457)	(0.00468)	(0.00491)
ESF paid	-0.00018	3.64e-05	0.000185	0.000152	-5.40e-05	-3.76e-05	1.15e-05
	(0.00130)	(0.000239)	(0.000724)	(0.000584)	(0.000562)	(0.000518)	(0.000445)
ESF financed	-0.091**	-0.0127*	-0.00984	-0.00601	-0.00844*	-0.00856**	-0.00791**
	(0.0411)	(0.00677)	(0.00789)	(0.00542)	(0.00510)	(0.00422)	(0.00392)
Observations	850						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients of the baseline model and relative to the country and year fixed effects. We stress how each line of the above estimates are obtained separately.

iv. Quality of government

Table A5. Estimated coefficients for the QoG model – robustness version

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
EQI score	0.298***	0.0853***	0.0980***	0.0806***	0.0802***	0.0814***	0.0871***
	(0.0422)	(0.0132)	(0.0162)	(0.0127)	(0.0125)	(0.0127)	(0.0104)
DT	-0.00661	0.0177	0.0364*	0.00701	0.0161	0.0189	0.0202
	(0.193)	(0.0293)	(0.0205)	(0.0210)	(0.0192)	(0.0168)	(0.0134)
High risk of DT	-0.116	-0.00740	-0.00860	0.00590	0.00363	0.00345	-0.0122
	(0.161)	(0.0280)	(0.0233)	(0.0153)	(0.0146)	(0.0133)	(0.0123)
Quality	0.191***	0.0333***	0.0126	0.0230**	0.0287***	0.0336***	0.0336***
	(0.0658)	(0.0127)	(0.0144)	(0.00910)	(0.00507)	(0.00464)	(0.00406)
DT	-0.0739	-0.00155	0.0107	-0.00891	-0.00609	-0.00450	-0.00407
	(0.187)	(0.0270)	(0.0170)	(0.0174)	(0.0177)	(0.0158)	(0.0141)
High risk of DT	-0.0876	-0.0136	-0.0190	-0.00690	-0.00324	0.00426	-0.0135
	(0.178)	(0.0308)	(0.0207)	(0.0160)	(0.0156)	(0.0133)	(0.0121)
Impartiality	0.250***	0.0885***	0.0974***	0.0877***	0.0927***	0.0959***	0.0863***
	(0.0408)	(0.0101)	(0.0142)	(0.0140)	(0.0148)	(0.0162)	(0.0158)
DT	-0.0271	0.0133	0.0275	0.00973	0.0153	0.0121	0.00815
	(0.194)	(0.0290)	(0.0184)	(0.0210)	(0.0187)	(0.0172)	(0.0133)
High risk of DT	-0.194	-0.0273	-0.0284	-0.0179	-0.0116	-0.00643	-0.0233**
	(0.171)	(0.0296)	(0.0189)	(0.0155)	(0.0152)	(0.0135)	(0.0117)
Corruption	0.0881	0.0174	0.0596	0.0140**	0.0170**	0.0182**	0.0155**
	(0.0634)	(0.0134)	(0.0826)	(0.00652)	(0.00721)	(0.00805)	(0.00709)
DT	-0.0658	-0.00151	0.0214	-0.00539	-0.00511	-0.00754	-0.00696
	(0.188)	(0.0271)	(0.0213)	(0.0187)	(0.0177)	(0.0158)	(0.0136)
High risk of DT	-0.170	-0.0265	-0.0257	-0.0218	-0.0157	-0.00439	-0.0201
	(0.170)	(0.0290)	(0.0159)	(0.0158)	(0.0162)	(0.0141)	(0.0124)
Observations	870						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. For the sake of brevity, we do not report the coefficients of the baseline model and relative to the country and year fixed effects. We stress how each line of the above estimates are obtained separately.

c. Full regressions results

i. Baseline

Table A6. Estimated coefficients for the baseline model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.330***	-0.051***	-0.0338***	-0.0405***	-0.0413***	-0.0414***	-0.0331***
	(0.110)	(0.0184)	(0.0111)	(0.0108)	(0.00998)	(0.00869)	(0.00771)
Tourism arrivals	0.232	0.0335	0.0531***	0.0612***	0.0385***	0.0225**	0.0134
	(0.141)	(0.0254)	(0.0189)	(0.0133)	(0.0140)	(0.0112)	(0.00825)
Number of HEIs	0.401***	0.0687***	0.0771***	0.0911***	0.0868***	0.0723***	0.0633***
	(0.118)	(0.0208)	(0.0208)	(0.0118)	(0.00951)	(0.00930)	(0.00704)
Capital city	0.184	0.0175	-0.00287	0.0169	0.0255*	0.0320**	0.0405***
	(0.179)	(0.0284)	(0.0181)	(0.0159)	(0.0141)	(0.0136)	(0.0111)
Population	0.714***	0.123***	0.165***	0.106***	0.0878***	0.0851***	0.0879***
	(0.186)	(0.0351)	(0.0344)	(0.0208)	(0.0154)	(0.0122)	(0.00879)
DT1	-0.207	-0.0310	-0.0276	-0.0453**	-0.0441**	-0.0168	0.0154
	(0.201)	(0.0330)	(0.0193)	(0.0194)	(0.0225)	(0.0207)	(0.0176)
HighriskDT1	-0.197	-0.0401	-0.0658***	-0.0543***	-0.0290*	-0.00784	-0.00941

	(0.139)	(0.0247)	(0.0166)	(0.0163)	(0.0155)	(0.0123)	(0.00966)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

ii. RCI and sub-dimensions

Table A7. Estimated coefficients for the RCI model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.250**	-0.0435**	-0.0225*	-0.0301***	-0.0345***	-0.0389***	-0.0358***
	(0.116)	(0.0184)	(0.0122)	(0.0116)	(0.0101)	(0.00897)	(0.00775)
Tourism arrivals	0.223	0.0329	0.0483**	0.0595***	0.0402***	0.0240**	0.0147*
	(0.143)	(0.0250)	(0.0202)	(0.0131)	(0.0140)	(0.0109)	(0.00830)
Number of HEIs	0.386***	0.0603***	0.0694***	0.0792***	0.0774***	0.0663***	0.0590***
	(0.116)	(0.0211)	(0.0221)	(0.0135)	(0.00984)	(0.00936)	(0.00708)
Capital city	0.0101	-0.00125	-0.0243	-0.00370	0.00768	0.0174	0.0264**
	(0.190)	(0.0286)	(0.0187)	(0.0177)	(0.0149)	(0.0142)	(0.0115)
Population	0.706***	0.126***	0.167***	0.114***	0.0928***	0.0882***	0.0857***
	(0.180)	(0.0349)	(0.0351)	(0.0220)	(0.0156)	(0.0122)	(0.00879)
DT1	-0.0849	-0.00866	-0.0119	-0.0225	-0.00724	-0.0106	0.00284
	(0.197)	(0.0338)	(0.0224)	(0.0233)	(0.0253)	(0.0178)	(0.0140)
HighriskDT1	-0.192	-0.0402	-0.0659***	-0.0542***	-0.0326**	-0.0120	-0.0107
	(0.137)	(0.0246)	(0.0181)	(0.0161)	(0.0152)	(0.0129)	(0.01000)
RCI	0.0118**	0.0530**	0.0590**	0.0401**	0.0433***	0.0466***	0.0467***
	(0.0057)	(0.0210)	(0.0297)	(0.0159)	(0.0129)	(0.00949)	(0.00792)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A8. Estimated coefficients for the RCI-basic model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.301***	-0.050***	-0.0340***	-0.0393***	-0.0404***	-0.0407***	-0.0335***
	(0.111)	(0.0184)	(0.0110)	(0.0110)	(0.00992)	(0.00869)	(0.00771)
Tourism arrivals	0.232	0.0344	0.0521***	0.0617***	0.0395***	0.0231**	0.0144*
	(0.142)	(0.0253)	(0.0189)	(0.0132)	(0.0139)	(0.0112)	(0.00827)
Number of HEIs	0.400***	0.0671***	0.0772***	0.0879***	0.0847***	0.0706***	0.0617***
	(0.117)	(0.0210)	(0.0208)	(0.0125)	(0.00966)	(0.00932)	(0.00706)
Capital city	0.141	0.0159	-0.000631	0.0147	0.0238*	0.0310**	0.0404***
	(0.180)	(0.0283)	(0.0181)	(0.0162)	(0.0141)	(0.0136)	(0.0112)
Population	0.699***	0.123***	0.166***	0.109***	0.0888***	0.0861***	0.0880***
	(0.183)	(0.0352)	(0.0344)	(0.0214)	(0.0154)	(0.0122)	(0.00887)
DT1	-0.151	-0.0294	-0.0310	-0.0447**	-0.0412*	-0.0154	0.0146
	(0.200)	(0.0329)	(0.0193)	(0.0196)	(0.0225)	(0.0203)	(0.0171)
HighriskDT1	-0.189	-0.0402	-0.0657***	-0.0546***	-0.0294*	-0.00864	-0.00976
	(0.137)	(0.0247)	(0.0165)	(0.0162)	(0.0154)	(0.0124)	(0.00975)
Basic	0.0117	0.0112	-0.0161	0.00776	0.0106**	0.0147***	0.0163***
	(0.0113)	(0.00719)	(0.0116)	(0.00582)	(0.00456)	(0.00422)	(0.00337)

Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A9. Estimated coefficients for the RCI-innovation model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.164	-0.0437**	-0.00675	-0.0279**	-0.0346***	-0.0366***	-0.0308***
	(0.122)	(0.0188)	(0.0183)	(0.0140)	(0.0101)	(0.00884)	(0.00777)
Tourism arrivals	0.204	0.0297	0.0404*	0.0537***	0.0343**	0.0200*	0.0112
	(0.139)	(0.0253)	(0.0215)	(0.0136)	(0.0139)	(0.0111)	(0.00827)
Number of HEIs	0.372***	0.0632***	0.0619***	0.0780***	0.0807***	0.0686***	0.0603***
	(0.115)	(0.0212)	(0.0233)	(0.0151)	(0.00980)	(0.00939)	(0.00710)
Capital city	-0.102	0.0103	-0.0385	0.00163	0.0206	0.0278**	0.0372***
	(0.194)	(0.0281)	(0.0238)	(0.0207)	(0.0143)	(0.0137)	(0.0117)
Population	0.702***	0.129***	0.172***	0.121***	0.0955***	0.0893***	0.0902***
	(0.177)	(0.0354)	(0.0360)	(0.0236)	(0.0156)	(0.0123)	(0.00903)
DT1	-0.0564	-0.0252	-0.0176	-0.0411*	-0.0373*	-0.0137	0.0154
	(0.189)	(0.0330)	(0.0219)	(0.0211)	(0.0225)	(0.0202)	(0.0172)
HighriskDT1	-0.202	-0.0395	-0.0673***	-0.0557***	-0.0291*	-0.00824	-0.00974
	(0.136)	(0.0245)	(0.0190)	(0.0162)	(0.0154)	(0.0123)	(0.00976)
Innovation	0.021***	0.0278*	0.139**	0.0403	0.0192*	0.0209***	0.0225***
	(0.0069)	(0.0162)	(0.0693)	(0.0377)	(0.0101)	(0.00619)	(0.00526)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A10. Estimated coefficients for the RCI-efficiency model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.277**	-0.0404**	-0.0243**	-0.0290**	-0.0340***	-0.0375***	-0.0317***
	(0.113)	(0.0183)	(0.0121)	(0.0115)	(0.0101)	(0.00914)	(0.00778)
Tourism arrivals	0.223	0.0295	0.0499**	0.0572***	0.0373***	0.0194*	0.00697
	(0.143)	(0.0255)	(0.0201)	(0.0134)	(0.0137)	(0.0110)	(0.00857)
Number of HEIs	0.388***	0.0637***	0.0688***	0.0827***	0.0808***	0.0686***	0.0625***
	(0.117)	(0.0209)	(0.0230)	(0.0130)	(0.00939)	(0.00936)	(0.00731)
Capital city	0.0485	-0.00603	-0.0180	-0.00203	0.00126	0.00936	0.0211
	(0.188)	(0.0296)	(0.0179)	(0.0176)	(0.0164)	(0.0156)	(0.0133)
Population	0.715***	0.127***	0.171***	0.113***	0.0926***	0.0906***	0.0908***
	(0.182)	(0.0348)	(0.0358)	(0.0217)	(0.0149)	(0.0122)	(0.00942)
DT1	-0.101	-0.00566	-0.0186	-0.0221	-0.00474	-0.00395	0.00603
	(0.201)	(0.0341)	(0.0202)	(0.0230)	(0.0238)	(0.0193)	(0.0141)
HighriskDT1	-0.187	-0.0374	-0.0687***	-0.0510***	-0.0326**	-0.0128	-0.00831
	(0.137)	(0.0245)	(0.0179)	(0.0157)	(0.0145)	(0.0134)	(0.0104)
Efficiency	0.0110*	0.128***	0.0721**	0.0911***	0.111***	0.114***	0.123***
	(0.0059)	(0.0477)	(0.0332)	(0.0294)	(0.0276)	(0.0247)	(0.0212)
Observations	1115						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

iii. European funding

Table A11. Estimated coefficients for the EU funding ERDF financed model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.281**	-0.0435**	-0.0290**	-0.0316**	-0.0336***	-0.0351***	-0.0300***
	(0.108)	(0.0181)	(0.0129)	(0.0125)	(0.0110)	(0.00991)	(0.00973)
Tourism arrivals	0.153	0.0193	0.0153	0.0353**	0.0289**	0.0208*	0.0127
	(0.139)	(0.0255)	(0.0223)	(0.0151)	(0.0147)	(0.0124)	(0.0106)
Number of HEIs	0.374***	0.0637***	0.0840***	0.0877***	0.0786***	0.0638***	0.0549***
	(0.126)	(0.0221)	(0.0200)	(0.0138)	(0.0116)	(0.0107)	(0.00822)
Capital city	0.309*	0.0319	0.0128	0.0276	0.0422**	0.0500***	0.0554***
	(0.183)	(0.0291)	(0.0211)	(0.0189)	(0.0175)	(0.0156)	(0.0155)
Population	0.849***	0.143***	0.179***	0.129***	0.107***	0.104***	0.105***
	(0.202)	(0.0382)	(0.0369)	(0.0243)	(0.0182)	(0.0149)	(0.0118)
DT1	-0.222	-0.0338	-0.0490**	-0.0603***	-0.0430	-0.00779	0.0209
	(0.203)	(0.0337)	(0.0206)	(0.0214)	(0.0264)	(0.0251)	(0.0203)
HighriskDT1	-0.190	-0.0383	-0.0742***	-0.0629***	-0.0253	-0.00505	-0.00931
	(0.138)	(0.0239)	(0.0162)	(0.0195)	(0.0174)	(0.0132)	(0.0106)
ERDF financed	-0.0341	-0.00292	0.00910*	0.00301	-0.00454	-0.00724	-0.00293
	(0.0370)	(0.00608)	(0.00493)	(0.00440)	(0.00453)	(0.00471)	(0.00488)
Observations	850						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A12. Estimated coefficients for the EU funding ERDF paid model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.29***	-0.0443**	-0.0259**	-0.0303**	-0.0351***	-0.0371***	-0.0309***
	(0.107)	(0.0180)	(0.0123)	(0.0121)	(0.0109)	(0.00978)	(0.00961)
Tourism arrivals	0.157	0.0196	0.0132	0.0350**	0.0287*	0.0193	0.0123
	(0.140)	(0.0255)	(0.0229)	(0.0151)	(0.0147)	(0.0123)	(0.0104)
Number of HEIs	0.374***	0.0637***	0.0815***	0.0873***	0.0789***	0.0645***	0.0556***
	(0.126)	(0.0221)	(0.0202)	(0.0138)	(0.0116)	(0.0107)	(0.00812)
Capital city	0.324*	0.0333	0.00900	0.0269	0.0434**	0.0506***	0.0547***
	(0.184)	(0.0294)	(0.0210)	(0.0192)	(0.0175)	(0.0150)	(0.0151)
Population	0.815***	0.140***	0.190***	0.132***	0.103***	0.0971***	0.101***
	(0.198)	(0.0377)	(0.0369)	(0.0236)	(0.0180)	(0.0149)	(0.0109)
DT1	-0.241	-0.0353	-0.0441**	-0.0577***	-0.0467*	-0.0111	0.0193
	(0.203)	(0.0334)	(0.0205)	(0.0209)	(0.0258)	(0.0259)	(0.0201)
HighriskDT1	-0.190	-0.0383	-0.0734***	-0.0626***	-0.0255	-0.00511	-0.00973
	(0.138)	(0.0238)	(0.0164)	(0.0194)	(0.0173)	(0.0132)	(0.0105)
ERDF paid	0.00162	0.000264	0.000138	0.000275	0.000332	0.000314	0.000371
	(0.0015)	(0.00024)	(0.000685)	(0.000559)	(0.000549)	(0.000493)	(0.000462)
Observations	850						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A13. Estimated coefficients for the EU funding ESF financed model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.257**	-0.0393**	-0.0225*	-0.0259**	-0.0298***	-0.0321***	-0.0282***
	(0.110)	(0.0183)	(0.0137)	(0.0128)	(0.0115)	(0.0103)	(0.00921)
Tourism arrivals	0.105	0.0121	0.0114	0.0288*	0.0187	0.0125	0.00898
	(0.140)	(0.0255)	(0.0238)	(0.0153)	(0.0148)	(0.0126)	(0.00934)
Number of HEIs	0.398***	0.0672***	0.0822***	0.0881***	0.0821***	0.0695***	0.0612***
	(0.124)	(0.0219)	(0.0214)	(0.0136)	(0.0115)	(0.0107)	(0.00835)
Capital city	0.273	0.0294	0.00292	0.0261	0.0415**	0.0459***	0.0512***
	(0.187)	(0.0304)	(0.0218)	(0.0216)	(0.0195)	(0.0165)	(0.0151)
Population	0.932***	0.156***	0.204***	0.145***	0.116***	0.105***	0.105***
	(0.206)	(0.0386)	(0.0424)	(0.0256)	(0.0190)	(0.0153)	(0.0120)
DT1	-0.251	-0.0387	-0.0431**	-0.0602***	-0.0571**	-0.0198	0.0150
	(0.195)	(0.0325)	(0.0203)	(0.0214)	(0.0249)	(0.0255)	(0.0218)
HighriskDT1	-0.191	-0.0380	-0.0724***	-0.0621***	-0.0258	-0.00498	-0.00971
	(0.136)	(0.0236)	(0.0171)	(0.0193)	(0.0178)	(0.0136)	(0.0108)
ESF financed	-0.105**	-0.0143**	-0.0148*	-0.00923	-0.00996**	-0.00892**	-0.00841**
	(0.0415)	(0.00675)	(0.00756)	(0.00561)	(0.00507)	(0.00418)	(0.00398)
Observations	850						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A14. Estimated coefficients for the EU funding ESF paid model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	**Poisson**	**q10**	**q25**	**q50**	**q75**	**q90**
Ruralness index	-0.279**	-0.0428**	-0.0285**	-0.0296**	-0.0325***	-0.0338***	-0.0293***
	(0.109)	(0.0182)	(0.0129)	(0.0122)	(0.0113)	(0.00992)	(0.00896)
Tourism arrivals	0.111	0.0126	0.0139	0.0291*	0.0188	0.0122	0.00786
	(0.140)	(0.0255)	(0.0232)	(0.0152)	(0.0148)	(0.0124)	(0.00931)
Number of HEIs	0.383***	0.0655***	0.0846***	0.0889***	0.0803***	0.0677***	0.0602***
	(0.125)	(0.0220)	(0.0208)	(0.0132)	(0.0115)	(0.0107)	(0.00832)
Capital city	0.344*	0.0388	0.0109	0.0341*	0.0493***	0.0529***	0.0545***
	(0.188)	(0.0302)	(0.0229)	(0.0204)	(0.0184)	(0.0154)	(0.0145)
Population	0.822***	0.141***	0.185***	0.133***	0.106***	0.0962***	0.0981***
	(0.198)	(0.0375)	(0.0379)	(0.0234)	(0.0180)	(0.0148)	(0.0110)
DT1	-0.267	-0.0400	-0.0421**	-0.0612***	-0.0584**	-0.0173	0.0153
	(0.199)	(0.0327)	(0.0206)	(0.0205)	(0.0250)	(0.0259)	(0.0209)
HighriskDT1	-0.199	-0.0390	-0.0745***	-0.0629***	-0.0262	-0.00501	-0.00901
	(0.138)	(0.0239)	(0.0172)	(0.0196)	(0.0177)	(0.0137)	(0.0109)
ESF paid	-0.00013	6.28e-05	0.000211	0.000125	-6.75e-05	2.97e-06	5.00e-05
	(0.0013)	(0.00024)	(0.000742)	(0.000600)	(0.000571)	(0.000513)	(0.000454)
Observations	850						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

iv. Quality of government

Table A15. Estimated coefficients for the EQI model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.280***	-0.0366**	-0.0192	-0.0226**	-0.0356***	-0.0404***	-0.0318***
	(0.104)	(0.0172)	(0.0118)	(0.0112)	(0.00958)	(0.00751)	(0.00728)
Population	0.506***	0.0811**	0.119***	0.0591***	0.0623***	0.0710***	0.0762***
	(0.173)	(0.0347)	(0.0343)	(0.0222)	(0.0172)	(0.0132)	(0.0110)
Tourism arrivals	0.279*	0.0314	0.0413*	0.0567***	0.0424***	0.0283***	0.0187**
	(0.147)	(0.0270)	(0.0248)	(0.0179)	(0.0141)	(0.0101)	(0.00939)
Number of HEIs	0.588***	0.108***	0.118***	0.124***	0.105***	0.0858***	0.0701***
	(0.100)	(0.0183)	(0.0123)	(0.00946)	(0.00969)	(0.00924)	(0.00841)
Capital city	0.186	0.0164	-0.00434	0.0226	0.0261*	0.0401***	0.0530***
	(0.150)	(0.0255)	(0.0188)	(0.0172)	(0.0157)	(0.0130)	(0.0120)
DT1	-0.0975	0.000467	0.0435**	0.0171	0.000162	0.00815	0.0243**
	(0.198)	(0.0326)	(0.0202)	(0.0190)	(0.0150)	(0.0128)	(0.0117)
HighriskDT1	0.00447	0.00990	-0.00361	0.0294**	0.0164	0.0146	0.00681
	(0.128)	(0.0225)	(0.0237)	(0.0137)	(0.0113)	(0.00940)	(0.00868)
EQI	0.266***	0.0728***	0.0820***	0.0749***	0.0758***	0.0768***	0.0795***
	(0.0465)	(0.0175)	(0.0154)	(0.0131)	(0.0130)	(0.0123)	(0.0104)
Observations	870						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A16. Estimated coefficients for the EQI-quality model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.269**	-0.0369**	-0.0220*	-0.0246**	-0.0357***	-0.0408***	-0.0362***
	(0.105)	(0.0174)	(0.0115)	(0.0108)	(0.00921)	(0.00760)	(0.00763)
Population	0.436***	0.0646*	0.0874***	0.0383*	0.0445***	0.0581***	0.0649***
	(0.167)	(0.0339)	(0.0325)	(0.0211)	(0.0162)	(0.0128)	(0.0104)
Tourism arrivals	0.305**	0.0401	0.0569**	0.0689***	0.0511***	0.0338***	0.0224**
	(0.148)	(0.0274)	(0.0238)	(0.0177)	(0.0135)	(0.0102)	(0.00943)
Number of HEIs	0.630***	0.115***	0.137***	0.134***	0.112***	0.0894***	0.0733***
	(0.0997)	(0.0188)	(0.0164)	(0.00961)	(0.00974)	(0.00933)	(0.00818)
Capital city	0.205	0.0148	-0.0105	0.0177	0.0245	0.0352***	0.0429***
	(0.151)	(0.0256)	(0.0187)	(0.0163)	(0.0150)	(0.0126)	(0.0111)
DT1	-0.123	-0.00860	0.0483*	0.00916	-0.0121	-0.00605	0.00865
	(0.195)	(0.0319)	(0.0254)	(0.0180)	(0.0139)	(0.0119)	(0.0123)
HighriskDT1	0.0328	0.00849	0.00198	0.0236*	0.0138	0.0173*	0.00930
	(0.137)	(0.0240)	(0.0205)	(0.0142)	(0.0117)	(0.00915)	(0.00876)
Quality	0.185***	0.0326***	0.0482	0.0241***	0.0293***	0.0341***	0.0361***
	(0.0613)	(0.0120)	(0.0649)	(0.00871)	(0.00480)	(0.00454)	(0.00413)
Observations	870						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A17. Estimated coefficients for the EQI-impartiality model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.291***	-0.0393**	-0.0172	-0.0243**	-0.0376***	-0.0413***	-0.0309***
	(0.105)	(0.0174)	(0.0117)	(0.0115)	(0.00971)	(0.00772)	(0.00719)
Population	0.509***	0.0864**	0.127***	0.0706***	0.0708***	0.0760***	0.0801***
	(0.174)	(0.0350)	(0.0351)	(0.0231)	(0.0180)	(0.0137)	(0.0110)
Tourism arrivals	0.300**	0.0337	0.0360	0.0569***	0.0435***	0.0292***	0.0182**
	(0.148)	(0.0273)	(0.0261)	(0.0181)	(0.0143)	(0.0102)	(0.00927)
Number of HEIs	0.579***	0.104***	0.119***	0.118***	0.0988***	0.0821***	0.0695***
	(0.103)	(0.0188)	(0.0122)	(0.0100)	(0.0103)	(0.00929)	(0.00811)
Capital city	0.160	0.0101	-0.0122	0.0120	0.0231	0.0383***	0.0512***
	(0.151)	(0.0255)	(0.0176)	(0.0177)	(0.0158)	(0.0129)	(0.0109)
DT1	-0.109	-0.00162	0.0377*	0.0187	0.000753	0.00620	0.0194
	(0.199)	(0.0328)	(0.0199)	(0.0187)	(0.0147)	(0.0130)	(0.0120)
HighriskDT1	-0.0505	-0.00318	-0.0131	0.00992	0.00742	0.0105	0.00160
	(0.136)	(0.0237)	(0.0211)	(0.0139)	(0.0117)	(0.00961)	(0.00873)
Impartiality	0.221***	0.0746***	0.0763***	0.0801***	0.0842***	0.0854***	0.0857***
	-0.0457	(0.0172)	(0.0152)	(0.0148)	(0.0152)	(0.0174)	(0.0160)
Observations	870						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.

Table A18. Estimated coefficients for the EQI-corruption model – full results

VARIABLES	Number of contracted E+ mobilities						
	OLS	Poisson	q10	q25	q50	q75	q90
Ruralness index	-0.286***	-0.0393**	-0.0238**	-0.0275**	-0.0379***	-0.0431***	-0.0385***
	(0.106)	(0.0175)	(0.0113)	(0.0111)	(0.00940)	(0.00782)	(0.00765)
Population	0.421**	0.0629*	0.0819***	0.0346	0.0418***	0.0580***	0.0652***
	(0.171)	(0.0344)	(0.0313)	(0.0213)	(0.0162)	(0.0131)	(0.0101)
Tourism arrivals	0.346**	0.0465*	0.0575**	0.0786***	0.0579***	0.0376***	0.0262***
	(0.148)	(0.0273)	(0.0252)	(0.0176)	(0.0134)	(0.0104)	(0.00924)
Number of HEIs	0.625***	0.114***	0.144***	0.132***	0.111***	0.0885***	0.0714***
	(0.101)	(0.0189)	(0.0114)	(0.00958)	(0.00978)	(0.00969)	(0.00804)
Capital city	0.150	0.00616	-0.0195	0.00980	0.0159	0.0276**	0.0332***
	(0.150)	(0.0253)	(0.0179)	(0.0177)	(0.0149)	(0.0124)	(0.0105)
DT1	-0.122	-0.00893	0.0436**	0.0132	-0.0110	-0.00787	0.00611
	(0.197)	(0.0320)	(0.0199)	(0.0180)	(0.0138)	(0.0119)	(0.0124)
HighriskDT1	-0.0358	-0.00293	-0.0105	0.0101	0.00463	0.0115	0.00452
	(0.133)	(0.0231)	(0.0186)	(0.0145)	(0.0121)	(0.00981)	(0.00900)
Corruption	0.0788	0.0134	-0.0196	0.0121*	0.0168**	0.0183**	0.0152**
	(0.0577)	(0.0123)	(0.0142)	(0.00632)	(0.00741)	(0.00766)	(0.00725)
Observations	870						

N.B. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The model also includes country and year fixed effects.