ANDRÁSSY
UNIVERSITÄT
BUDAPEST

ANDRÁSSY WORKING PAPER SERIES
IN ECONOMICS AND BUSINESS ADMINISTRATION

Florian Bucher
Martina Eckardt

The EGCT as a Governance form for Cross-Border Cooperation – a Spatial Analysis of its Critical Success Factors

2022

Author's address and affiliation:
Florian Bucher (florian.bucher@andrassyuni.hu)
Martina Eckardt (martina.eckardt@andrassyuni.hu)
———————

The EGTC as a Governance Form for Cross-Border Cooperation - a Spatial Analysis of its Critical Success Factors

Florian Bucher, Andrassy University Budapest, email: florian.bucher@andrassyuni.hu

Martina Eckardt, Andrassy University Budapest, email: martina.eckardt@andrassyuni.hu

Abstract

Over the last decades, within the EU, borders became increasingly open and lost in significance as barriers to the free movement of people and goods and for cross-border cooperation. In 2006, the European Grouping of Territorial Cooperation (EGTC) was introduced as a supranational EU-wide legal form for cross-border governance and EU-regional policy. It fosters smart territorial development with international collaboration between sub-national governments. In mid-2022, there are 84 EGTCs registered in the EU. We use an original panel dataset of 214 NUTS2-regions from 2006 to 2021. We apply logistic cross-section regressions to evaluate the probability of at least one EGTC being introduced, respectively an EGTC being introduced for the first time in a region, controlling for spatial spill-over. Seven hypotheses regarding frictions connected to social capital, proximity, and relative characteristics of regions and EGTC adoption are tested.

Concerning social capital, we find evidence that the level of generalized trust in a region is a significant determinant of EGTCs. Regarding proximity factors, infrastructural connectivity and cross-border regions with a common language show a positive impact. Surprisingly mountains in border areas are no friction for cooperation, but mountainous border regions have a higher probability of EGTC adoption. We do not find evidence for spatial spill-overs in the process of EGTC introduction. As regards relative characteristics, such as economic disparities and discrepancies in agglomeration structure, we find no evidence of impact on EGTC introduction. Therefore, it seems not to be impacted by obstacles such as economic and social discrepancies

Keywords: Cross-Border Cooperation, Spatial Analysis, EGTC, European Integration

1. Introduction

In spring 2020 several EU member states reacted with sudden and unannounced border closures to the first wave of the COVID-19 pandemic. This had profound negative impacts on border regions with strong cross-border links. In some cases, there were no exceptions at all to cross borders, neither for family members, pupils, students, or employees nor for business traffic. This unexpected shock demonstrated how strong economic and social ties have developed in border regions. Consequently, in the next waves of the pandemic, exceptions for local frontier traffic were implemented. This, however, required additional efforts to keep cross-border commuters informed on the pandemic situation and respective applicable regulations in the neighbouring country. As they often changed daily and unpredictably, additional strong communication links at the level of local governments in border regions were required. Existing institutionalized cross-border communication structures on regional or local administrative levels proved helpful, like in the Pamina Eurodistrict, which is set up in the form of a European Grouping of Territorial Cooperation (EGTC).

However, it is not only the Covid-19 pandemic that once again made clear that adequate institutions are a necessary governance prerequisite to foster cross-border cooperation. Within the EU, borders became more and more open over the last decades; they lost dramatically in significance although they still pose obstacles to cross-border cooperation. Since the mid-1980ies the four freedoms of free movement of people, goods, services, and capital are at the backbone of the Common Market. In addition, the 1986 Schengen agreement allows the crossing of internal borders for all EU citizens without border checks. But despite all efforts by both reducing legal obstacles through the Common Market and the Schengen Agreement as well as actively supporting border regions by first INTERREG and then European Territorial Cooperation as part of the overall cohesion policies, some recent surveys find that borders still form huge barriers for cross-border cooperation in the EU. According to the 2015 Eurobarometer survey (European Commission, 2015) as well as to a public consultation by DG Regio in 2016, the main obstacles are: legal and administrative barriers, language differences, difficulties in accessibility, economic disparities, and social discrepancies (European Commission, 2015; Medeiros, 2018; Svensson and Balogh, 2018).

To overcome these impediments to cross-border cooperation, institutionalized governance tools are necessary. The European Grouping of Territorial Cooperation, enacted in 2006 (Regulation 2006) is exactly intended to fill this institutional gap "by being a genuine unitary

institution representing different [administrative, F.B./M.E.] levels simultaneously" in a cross-border or, generally, international environment (Lange and Pires, 2018, p. 139). It is a supranational legal form for public entities that was created especially as an institutional structure to "facilitate and promote …. territorial cooperation, including one or more of the cross-border, transnational and interregional strands of cooperation between its members …, with the aim of strengthening Union economic, social and territorial cohesion" (Regulation 2013, art.1) and "the overcoming of internal market barriers" (Regulation 2013, art.7). The members establishing an EGTC are sub-national governments and public entities from at least two member states. Those might be from different hierarchical administrative levels – for example, from local and regional government branches. In this way, differences among member states in the allocation of competencies between different levels of state administration are considered. The EGTC has its own legal personality, can employ its own personnel, and may take out credit on its own (Eckardt and Okruch, 2021). In mid-2022, there had been 84 EGTCs established since 2008 with approximately 1,000 members. About 90% of them are set up explicitly for cross-border cooperation (Evrard and Engl, 2018, p. 220)(1). The main areas of activities regard designing regional cross-border development strategies, promoting cross-border networks, and providing cross-border services (Evrard and Engl, 2018, p. 210).

While the EGTC could provide the necessary governance structure for subnational governments to more effectively collaborate across borders, its introduction itself might suffer from the obstacles to cross-border cooperation. For this reason, the question arises which characteristics of regions favour the introduction of cross-border cooperation, in this case by means of EGTC, on the one hand, and which frictions exist for this on the other hand. **In this paper, we aim to provide empirical evidence on the structural characteristics of border regions that correlate with the adoption of the EGTC as an institutionalized governance tool for cross-border cooperation.** In particular, we analyse how the level of **social capital**, different aspects of **proximity (regarding infrastructure, geography, culture, and spatial relations),** and **economic and social discrepancies** are connected to the probability of at least one EGTC being introduced. To this end, we use an original data set from the 214 NUTS2 regions in the EU with data from 2006 to 2021(2). We perform cross-sectional logistic

---

[1] We checked the official list of EGTCs in 2022 and can confirm the indication of about 90% of the EGTCs being focused on cross-border cooperation (Committee of the Regions 2022). However, delimitations are not always clear.
[2] We use the NUTS2 level because it is the most relevant when it comes to EU funding regarding territorial cooperation. In addition, although most members of EGTCs are municipalities or other local entities for which the NUTS3 level would give a more accurate picture, data availability at this level is much poorer. Therefore, we

regressions and, in a panel set-up, logit random effects regressions to control for spatial spill-overs.

We supplement previous research in several ways. Building on the work of Eckardt and Okruch (2019) and Eckardt (2019) our study contributes to research on the institutionalization of cross-border cooperation by the EGTC in particular by providing additional empirical evidence on the structural drivers or obstacles of its adoption. We focus on the meso-level, not on the micro-level that is, on single actors in cross-border cooperation by analysing what regional characteristics constitute potential obstacles to the establishment of an EGTC. Finally, we provide a genuine dataset and use novel indicators to test our hypotheses. Thus, we open up new strands for further research as our research contributes to the literature on the EGTC and cross-border cooperation more generally.

The structure of the paper is as follows: Section 2 reviews the most relevant empirical literature, section 3 presents our hypotheses and variables, section 4 the data and methodology. Section 5 shows our estimation results and discusses our findings. Section 6 concludes.

2. Literature review

There is a large and still growing body of literature analysing different aspects of cross-border cooperation. Following Svensson and Balogh (2018) cross-border cooperation can be "any activity that seeks to align the resources of at least two actors, situated on different sides of a border, in order to achieve one or several jointly defined goal/s" (Svensson and Balogh, 2018, p. 126). The emphasis is on public actors which might come from different governmental levels, be it local or regional ones, depending on a state's constitutional set up. A variety of disciplines – including regional studies, border studies, geography, regional planning, international relations, legal science, political sciences, and economics – use different perspectives and apply different methodologies. Each of these also analyses the question of incentives and obstacles to cross-border cooperation from their specific perspective, whereby there are many overlaps concerning the findings on which are the most relevant factors.

Several recently published review articles from various sub-disciplines show the need to provide a theoretical concept for the fragmented literature (c.f. Sohn, 2018, Hataley and Leuprecht, 2018; Wong Villanueva *et al.*, 2020).

---

focus on the NUTS2 level, well knowing that this reduces the overall explanatory power of our analysis. For more on this see Eurostat (2022).

Jaansoo (2019, 50–90) summarised her findings of an extensive systematic literature review in a unified theoretical concept based on the transaction costs approach to analyse the determinants of institutionalised cross-border cooperation in which EGTCs are one option (see Figure 1). Cross-border cooperation is always based on the decision of subnational actors to initiate or participate in it since no automatism would lead to the introduction of an EGTC or any other form of institutionalised cross-border cooperation. This is evident in Jaansoo's systematic account. According to this, the main factors affecting cross-border cooperation can be summarised in four categories**: (1) the expected welfare gains from cooperation in the form of efficiency and effectiveness gains due to joint problem solving; (2) factors that influence (positively and negatively) the transaction costs incurred in collective problem solving; (3) financial, human and (im-) material resources available to the actors; and (4) the institutional framework conditions.** However, empirical studies often cover only some aspects from one or more of the above identified categories. Therefore, in the following, we structure the selected empirical studies according to the unit of analysis that is used in the respective research design.

Figure 1: Drivers of cross-border cooperation in a transaction costs approach
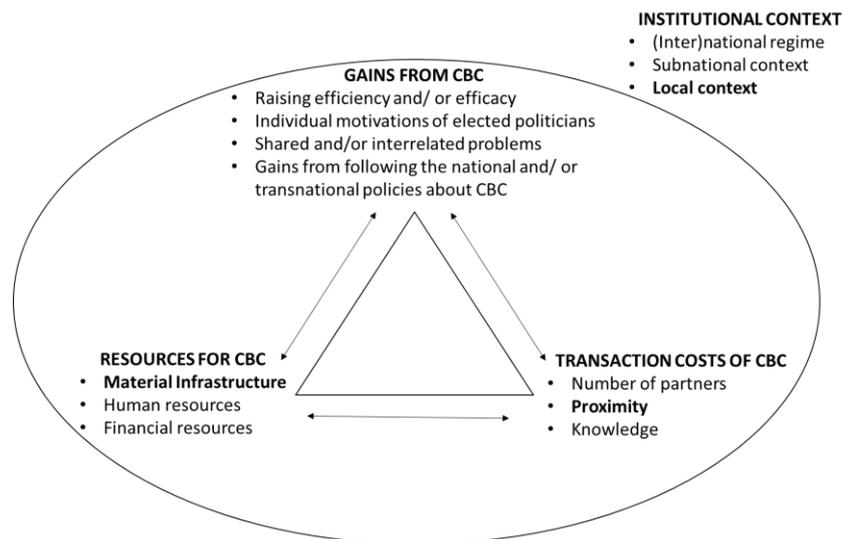
Source: Jaansoo (2019), Fig. 2.2, p.94 (accentuation F.B./ M.E.).

The object of study of the *institution-centred approach* is the very institution facilitating cross-border cooperation, such as the EGTC or the Euroregion. Here, the focus is on the members as well as on the objectives, instruments, fields of activity, available resources, and perceived obstacles to their activities as defined from the perspective of the institution for cross-border

cooperation as a corporate actor itself. Only a few studies follow such an approach, such as the annual monitoring reports of the EGTC carried out annually since 2011 on behalf of the Committee of the Region (Committee of the Regions, sev. years). These surveys are descriptive, but provide the most comprehensive and best available information and data on the working of established EGTCs, including not only their fields of activity but also regarding personnel, budgetary variables, or EU funds available. The strength of this approach is that insights can be gained into the conditions of the cross-border activities of these institutions themselves. However, the individual motivations of both members and non-members – which are also decisive for whether an EGTC is implemented or not – are not recorded and there is no information on the structural conditions of the regions that also shape the working of the analysed institutional forms.

In contrast to that, studies that follow *an actor-centred approach* focus explicitly on the members of subnational governments or other institutionalised forms of cross-border cooperation. Case studies with (semi-) structured interviews or standardised surveys are often applied to explicitly inquire about the goals, motivations, interests, and assessments of the actors relevant to the establishment and continuation of institutionalised cross-border cooperation. For example, Medve-Bálint and Svensson (2012) analyse the motivation and incentives of subnational governments to join Euroregions. They find, contrary to common belief, that common problems stemming from economic structural weaknesses in the border regions that are comprised by a Euroregion do not constitute an incentive for membership. In addition, the non-availability of internal resources does not pose obstacles. These findings are confirmed in Svensson's qualitative analysis of the drivers of the territorial formation of Euroregions which is based on 136 interviews with local representatives from six Euroregion case studies located at three EU borders (Svensson, 2013a). Besides economic homogeneity, she makes out cultural-linguistic proximity, politico-administrative similarity, and within-group social capital as determinants of cross-border cooperation (Svensson, 2013b, p. 55). Jaansoo (2019, pp. 164–200) provides a qualitative analysis regarding the drivers of cross-border cooperation in three different geopolitical settings. She finds the following factors to be conducive to cross-border cooperation: institutions that facilitate cross-border cooperation, proximity (as perceived physically, conceptually, and economically), experience with and knowledge about cross-border cooperation, and the availability of internal resources, be it financial or human capital. Jaansoo (2019, pp. 201–246) takes a quantitative approach to studying the determinants of the introduction of EGTCs and other forms of institutionalised

cross-border cooperation. Her analysis is based on online surveys carried out in 2016/17 among subnational governments of adjacent land borders, resulting in a sample of n=106. It is used to perform logistic regressions to account for the trade-off between perceived transaction costs and gains from EGTC membership. Jaansoo finds that again proximity as well as cost characteristics of the services provided by cross-border cooperation, larger population, and being from the EU15 all positively impact the likelihood of subnational governments to participate in cross-border cooperation, while institutional constraints tend to exert a negative influence. Whereas the strength of the actor-centred approach is that the subjective assessments of the actors are recorded, its weakness, however, is that information on the objective factors influencing the institutionalisation of cross-border cooperation is usually missing.

In contrast to that, *a structural approach* refers to the characteristics of the regions themselves as the object of analysis. It allows to capture the influence of actor-independent factors on institutionalised cross-border cooperation. In doing so, a wide range of information about border regions can be used for analysis. Some recent empirical studies follow such an approach. Eckardt (2019) uses a full sample of 281 NUTS2 regions with data from 2015 for an empirical analysis of drivers for the introduction of the EGTC. Her research design is based on the idea of transaction cost reduction as a critical factor. Additionally, based on innovation studies, regional innovation systems are taken into account. She finds evidence that both are valid explanatory strands for EGTC introduction. Using logistic regressions and spatial autoregressive models, she found that the likelihood of adopting an EGTC is significantly higher for NUTS2 regions that are land border regions, are from the EU15, show higher research and development spending, a higher absorptive capacity of their public administration, and have a medium to low population density. Eckardt and Okruch (2019) study the differences between NUTS2 regions with and without at least one EGTC established there. Based on the cross-section of 281 NUTS2 regions in the EU, they performed t-tests on equality of means and Mann-Whitney U-tests for equality of median. They find that NUTS2 regions where at least one EGTC was established in 2015 differed significantly regarding structural characteristics from those without EGTC: they were more populated, had a larger share of the population living in rural or intermediate areas, received more EU funding, had a higher growth rate of GDP per capita, but also a higher unemployment rate. Moreover, their GDP per capita was significantly lower which holds also for their spending on research and development and the perceived quality of public administration by the population. Although it remains open what the further necessary conditions are for the actors to become active based on such structural conditions of a region, the central strength of this approach is that the characteristics of the

underlying regions can be analysed regarding their effect on the introduction and implementation of cross-border cooperation.

To sum up, while most of the empirical literature is actor-centred, there are some recent empirical studies analysing structural characteristics as determinants for institutionalised cross-border cooperation. However, they do not account for the characteristics identified as general obstacles to cross-border cooperation. In particular factors such as social capital, (Svensson, 2013b), and proximity, as theoretically discussed by Jaansoo (2019) are not yet objects of empirical examination, Moreover, the studies so far only control for absolute levels of a certain parameter within a region, but not for differences between adjacent regions which might result in economic and social disparities that are connected to institutionalised cross-border cooperation. Therefore, we aim to fill this gap and address questions previously lacking in the empirical literature on cross-border cooperation via the EGTC by means of hypotheses that we formulate in the next section.

3. Regional characteristics promoting the adoption of an EGTC – hypotheses and variables

In the following, we present seven hypotheses and describe the variables to test their link to EGTC existence in a region empirically for the three key structural characteristics of regions that might impede institutionalized cross-border cooperation: social capital, proximity and relative differences between adjacent border regions. For an overview see *Table A.1* in the *Appendix.*

(1) Social Capital

The quality of public services is seen as a crucial factor for absorptive capacity – the ability of public actors to implement novel cross-border cooperation solutions like the EGTC (cf. Narula, 2004; Eckardt, 2019). The indicator widely used for approximating the regional quality of public services is the European Quality of Government Index (EQI). The EQI 2021 is based on 18 individual survey questions accounting for the perception of European citizens regarding corruption, impartiality and quality of public services – the regional deviation from the national average in EQI. This is centred around the country average of the World Government Indicators' data for 'control of corruption', 'government effectiveness', 'rule of law' and 'voice and accountability' with equal weighting (for technical details cf. The QoG Institute, 2021). It accounts for de-facto rules, and how they are perceived regionally by inhabitants. Due to its

construction of regional data centred around national WGI data, it approximates informal practices based on the formal rules (Charron *et al.*, 2022, p. 8).

However, there is also a broad literature pointing out empirically the importance of regional informal institutions in complementing formal institutions, respectively social capital or generalized trust level (compare for example Beugelsdijk and van Schaik, 2005; Tabellini, 2010; Parente, 2019; Muringani, 2022 among others). Svensson (2013a) also emphasised within-group social capital as one determinant of cross-border cooperation. We, therefore, argue that not only de-facto practises based on formal rules are crucial for introducing an EGTC, but informal factors matter, too. In this context the generalized trust level can be seen as the most relevant dimension for our research question on the impact of social capital on EGTC adoption. Based on the idea that cooperation leads to mutually beneficial outcomes, a lack of trust can be regarded as a situation comparable to a prisoner's dilemma. Therefore, the generalized trust level is crucial to overcome inefficient situations and complements formal rules responsible for external enforcement of rules (Tabellini, 2010, p. 683). Thus, we argue it is an element of social capital which is highly relevant for the ability to cooperate with partners from a different legal system, a different country, and implement a novel legal framework. We follow the broad literature using "generalized trust level" as a proxy for one crucial dimension of social capital. In line with Parente (2019), we use the average outcome by a NUTS2 region of the question "most people can be trusted or you can't be too careful" from the ESS 2018 (European Social Survey ERIC, 2019) (*ppltrst_18*) as a proxy (*3*). Muringani *et al.* (2021, 1420) argue that compared to the World Value Survey the European Value Survey is a more accurate proxy for the generalised trust level in European Regions. By this, we also bridge the gap between the actor-centred and structural parameters for cross-border cooperation.

Hypothesis 1: The probability of adopting an EGTC increases the higher the generalized trust level of citizens in a region.

---

3 In line with Parente (2019, p. 22), we exclude missing observations and refusals in the answers. To account for the distribution of the cross-classification of age group, gender, and education in the population and the marginal distribution in regions, we applied a post-stratification weighting including design weights (Weighting ESS Data, 2014). German regions were available at the NUTS1 level only. Therefore, NUTS2 regions were assumed to be equal to the NUTS1 region they belong to. In cases data was given at NUTS3 level, we aggregated to NUTS2 for merge.

(2) Proximity

Secondly, we ask if factors regarding proximity are not only general obstacles to cross-border cooperation, but also to the introduction of institutions like the EGTC that should foster cross-border cooperation. For this, we look at four characteristics of a border region which all relate to proximity: **accessibility, geographical barriers, cultural barriers, and spatial spill-overs**. By generating frictions for accessibility and communication, these factors might impede the adoption of an EGTC.

Following Jaansoo (2019, p. 78) material infrastructure, such as transportation, is listed as one crucial aspect in the context of cross-border cooperation**. A lack of accessibility of regions can be regarded as an obstacle to communication and exchange**. Also, the European Commission (2016) addressed in its cross-border review difficult physical access with a lack of infrastructures and integrated public transport systems as one of the main obstacles for border regions. Therefore, we argue that infrastructural connectivity in a region is important regarding how frictionless exchange among regions is – both physically and socially. We hypothesize that good connectivity favours the dissemination of information and exchange. To control for a region's infrastructural connectedness, we use data from Eurostat regarding *road accessibility* (Share of population in a 120 km radius accessible by road within 1h30) taken from the European Regional Competitiveness Index's raw data (*roadaccessibility*).

Hypothesis 2: The probability of adopting an EGTC increases the better the road accessibility in a region.

Using the same reasoning as for hypothesis 2 regarding road accessibility, the geographic characteristics of a region might have an impact on the adoption of an EGTC as a means for institutionalised cross-border cooperation, too, under the reservation not to make any causal statements. Eckardt (2019) found that land borders are the main driver for introducing an EGTC, while sea borders are not. From this, we follow ESPON (2007) to investigate the potential impact or connection of mountain regions as a geographic characteristic. Mountain regions create physical barriers to traffic and transport infrastructure leading to poorer quality of roads and increases in journey time (Setnikar Cankar *et al.*, 2014, p. 306). Accordingly, relative proximity decreases, and costs for cross-border cooperation rise. We argue that mountains might be natural frictions hindering the introduction of specific cross-border cooperation projects within the EGTC framework. This should lead to a lower probability of

the adoption of EGTCs in mountainous border regions. We use the NUTS3 Eurostat dummy variable for mountain regions, which is one if more than 50 % of the surface are mountains, more than 50 % of the population lives in mountains, or both (*4*). The mean value of a NUTS3 region, aggregated on the NUTS2 level, is calculated to code an indicator for mountain regions (*Mount_reg*).

Hypothesis 3: The probability of adopting an EGTC in a border region increases the less mountainous an adjacent border region.

Not only infrastructure and physical attributes can facilitate institutionalised cross-border cooperation, but cultural proximity, too. Introducing novel institutions like the EGTCs is a complex task that requires a lot of communication. A common language has a direct influence on communication effectiveness between individuals and organizations in different regions, they ease communication and common understanding (Svensson, 2013b, p. 53). In contrast to that, different languages might create obstacles to communication and thus cause higher transaction costs which could impede cross-border cooperation and thus the introduction of EGTCs. Furthermore, border areas have often experienced repeated re-drawings of frontiers over time, thus leading to a shared history of adjacent border regions which sometimes also shows in a common language. The European Commission (2016) listed language barriers as one of the five main obstacles for border regions. Thus, a common language (resp. a language understood and shared at both sides of national borders) serves as a signal for more cultural proximity. This could also increase the motivation for the often laborious activities necessary to make cross-border cooperation work since it promises additional benefits in terms of re-tying to a shared past. Therefore, we hypothesize that border regions with a common language with adjacent neighbour regions should show a higher probability of introducing an EGTC.

From the European language map (Figure 2) we code a dummy variable for NUTS2 regions having the same language in at least one adjacent NUTS2 region in a neighbouring country (*CBCultLan*) (*5*).

---

4 https://ec.europa.eu/eurostat/cache/RCI/#?vis=mountain.typology&lang=en, for technical details see Appendix A-1

5 https://commons.wikimedia.org/wiki/File:Simplified_Languages_of_Europe_map.svg

Hypothesis 4: The probability of adopting an EGTC in a border region increases when it has a common language with at least one adjacent border region in a neighbouring country.

Figure 2: European language map and coding for cross-border language regions

(2a) European language map

Source: Own representation based on Wikimedia.

(2b) Dummy for cross-border language regions
Source: Own representation.

From the diffusion literature, it is well-known that innovations take time to spread and that usually the adoption rate follows an S-shaped figure (Rogers, 1962). Central obstacles to the spread of the EGTC as a novel institution for cross-border cooperation are a lack of awareness as well as regulatory hurdles. To gain information on its benefits as well as how to implement and operate it gets easier where there are EGTCs already implemented close by since communication costs are lower between neighbouring regions. A key driver in EGTC adoption might be that actors learn from each other and thus that the spread of the EGTC across space is a self-reinforcing process. Therefore, *spatial proximity* to regions where EGTCs are already established should increase the chance of adopting an EGTC in a region. To this end, we control for whether the number of already established EGTCs in adjacent border regions ($N\_EGTC\_number_{i,t-1}$) is positively connected to the adoption of an EGTC in regions where none had existed so far.

Hypothesis 5: The probability of adopting an EGTC in a region for the first time increases the more EGTCs are already in place in adjacent NUTS2 regions across the national border.

(3) Relative differences between regions

There is a discussion of whether cooperation takes place rather between more homogenous or more heterogeneous regions (Svensson, 2013a, 2013b). When regions are more similar in terms of social and economic aspects, it is more likely that they face also similar problems for which cross-border cooperation could be a solution. Lundén emphasizes the problem of "hierarchical asymmetries between states" (Lundén, 2018, pp. 104–106) when it comes to solving problems that are local or regional but occur in a cross-border context. In this case, often the local or regional administration lacks jurisdiction so the problem gets shifted upwards in the state administration. Although there are the necessary competencies to solve it, such problems are often seen as being of minor importance at higher administrative levels. As a consequence, they are not put on the political or administrative agenda, and thus no efforts to solve them are made. With the EGTC a legal form to fill the thus arising institutional gap is available for solving shared problems at the local or regional levels. Also, economic disparities creating asymmetric flows are mentioned as one main obstacle border regions are facing by the European Commission (2016). Therefore, we argue that the less asymmetric adjacent NUTS2 region across the national border are and the more similar problems they share, the higher the probability of institutionalised cross-border cooperation and thus of adopting an EGTC.

In addition, following Svensson (2013b), economic asymmetries between adjacent border regions from different countries could lead to higher transaction costs of cross-border cooperation and thus reduce the probability of cross-border cooperation between regions. We test this claim empirically by calculating the GDP per capita with price power parity (both from Eurostat) for each border region relative to the adjacent border regions in its neighbouring countries. To account for *economic disparities*, we code the indicator as the difference compared to the average adjacent region in a neighbouring country in percent *(GDP_PPS_Dif)*. Therefore, the smaller the disparity, the smaller the indicator.

Hypothesis 6: The probability of adopting an EGTC in a border region increases the lower economic disparities are between a border region and adjacent border regions in a neighbouring country.

Another aspect of similarity which might affect the usefulness and necessity of cooperation between border regions is the *agglomeration structure* of a region. Rural regions face issues and challenges which are different to those of urban regions, due to different underlying factors,

such as depopulation due to outmigration and an ageing population, and significantly lower levels of GDP per capita with PPS (6). Therefore, rural regions face particular difficulties to provide infrastructure and services in healthcare, transportation, or education, for instance (Augère-Granier and McEldowney, 2021). In line with hypothesis 6, we assume that adjacent NUTS2 regions across the national border which are more similar regarding agglomeration structure face more similar problems and therefore are more likely to cooperate and vice versa. To account for similarity in agglomeration structure, we build a novel indicator based on Eurostat's classification for urban and rural regions (7). Analogous to the procedure for constructing an indicator for mountainous regions, the Eurostat indicator is aggregated from the NUTS3 to the NUTS2 level through averaging. For border regions, we calculate the average distance in percent in terms of the degree of agglomeration to neighbouring border regions abroad *(urban_reg_Dif)*.

Hypothesis 7: The probability of adopting an EGTC in a border region increases the less different a border region's agglomeration structure is compared to adjacent border regions in a neighbouring country.

4. Data and Estimation Methods

In the following, we describe the data used and methods applied to test the hypotheses developed above. We use the EU 2016 NUTS2 classification in this paper and data from Eurostat 2021. We compiled an original dataset of 214 NUTS2 regions of 23 EU countries from 2006 to 2021. Because we are interested especially in characteristics regarding connectedness, EU states and regions on islands without land borders are dropped from the sample to avoid distortion bias (8). Our dataset includes variables for EGTCs by NUTS2 level and control variables.

As of 2021, 114 NUTS2 level regions have at least one EGTC on their territory, with 77 of the NUTS2 regions with at least one EGTC being border regions (

---

6 Regressions available among request.
7 Eurostat (2020), for technical details see Appendix A.2.
8 Therefore, we exclude Cyprus, Malta, Ireland and the UK, because they have no land borders to other EU countries; we also excluded Luxemburg as an outlier to not distort results.

Table 1).

Table 1: Distribution of EGTCs in border and non-border regions, NUTS2 level, 2021

	Border region	**Non-border region**	**Sum**
EGTC	77	37	**114**
No EGTC	41	59	**100**
Sum	**118**	**96**	**214**

Source: Own calculation.

EGTCs exist all over the EU. However, they seem to cluster in the west, south-west, and south-east (Figure 3).

Figure 3: Number of EGTC by NUTS 2 region
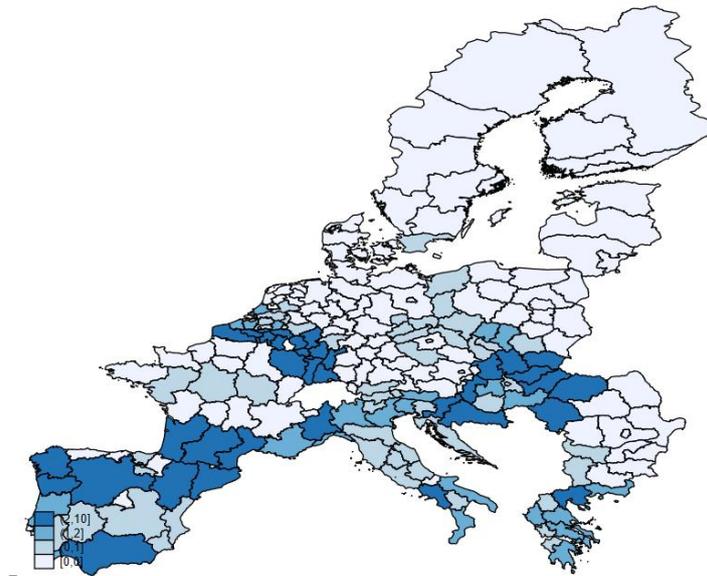
Source: Own representation.

Following Eckardt (2019), we build a logistic model to examine whether the characteristics of a certain NUTS2 region influence the probability of an EGTC being adopted on its territory. Considering her findings, we control for GDP per capita with price power parity *(GDP_PPS_pc),* the growth rate of GDP per capita with price power parity *(gGDP_PPS_pc),* gross capital formation per capita *(GFCF_PPS_pc), population* (all Eurostat), which all are relevant parameters for economic growth. In addition, quality of local administration *(EQI)* by using the European Quality of Government Index 2021 in its polynomial form for the NUTS2 regions (Charron et al., 2021) and being a border region (Border) are included. In line with

16

Eckardt (2019), we control for absorptive capacity of public administration to follow an inverse U-shaped pattern. Therefore, we apply *EQI* with a quadratic specification. Increasing absorptive capacity of public administration is connected to higher probability of an EGTC in a NUTS2 region only up to a certain threshold. Public administrations with a quality above that threshold are seen as having been capable to found other forms for institutionalized cross-border cooperation before the introduction of the EGTC as a legal form in 2006, while those with a very low absorptive capacity should lack the capability of adopting an EGTC.

Following Beck and Laeven (2006) who use "years under socialism" as an indicator for embeddedness regarding institutions and society in socialist structures, we include "years of a region being part of the EU" *(EU_years)* as an indicator for embeddedness in European Union institutions (own coding).

For hypotheses 1 to 4 and 6 to 7, a cross-section of all EGTCs existing in 2021 is used. The logit specification is as follows:

$$Logit\ EGTC\_dummy_{i,2021} = Const_{i,2021} + GDPpc\_pp\_{i,2019} + gGDPpc\_pp\_{i,2019} +$$
$$GFCF\_PPS\_pc_{i,2019\ +} + Population_{i,2019} + EQIi_{,2021} + EQIi_{,2021}^2 + EU\_years_{\,i,2021} +$$
$$Border_{\,i,2021} + hypothesis\ variable_{\,i,2021}$$

Because the introduction of an EGTC takes some time, and due to data availability and consistency, 2019 data is used for control variables. We supplement each model with a hypothesis variable to test whether the respective factor influences the probability of an EGTC being introduced in a region. Odds ratios are calculated for better interpretability. For hypothesis 1, the number of observation points is reduced from 214 to 196 due to data availability in the European Social Survey data. For hypotheses 3, 4, 6, and 7, which refer to characteristics of border regions, the data set is filtered only to contain border regions, reducing the sample to n=118.

To test if spatial spill-overs exist between NUTS2 regions (hypothesis 5), we use a panel logit specification with random effects for the period 2006 to 2021. A variable is coded for the first EGTC being introduced in a region (*new_EGTC_{i,t}*). To test whether the number of EGTCs in adjacent regions in the previous year (*N_EGTC_number_{i,t-1}*) increases the probability of an EGTC being introduced for the first time in a region, we estimate the following specification:

$$Logit\ new\_EGTC_{i,t} = Const_{i,t} + GDPpc\_pp\_{i,t} + gGDPpc\_pp\_{i,t} + GFCF\_PPS\_pc_{i,t} +$$

$$Population_{i,t} + Border_{i,t} + N\_EGTC\_number_{i,t-1} + hypothesis\ variable(s)_{i,2021t}$$

For descriptive data on the variables, see *Table 2*, for definition of variables see *Table A.2* in the *Appendix*.

Table 2: Descriptive statistics for all variables

VARIABLES	N	mean	sd	min	max
Cross-section 2021					
EGTC_number	214	1.238	1.643	0	9
EGTC_dummy	214	0.533	0.500	0	1
GDP_PPS_pc	214	29,968	10,331	11,268	61,875
gGDP_PPS_pc	214	0.0318	0.0173	0.000217	0.0925
GFCF_PPS_pc	214	6,616	3,025	1,339	19,801
Population	214	1.986e+06	1.650e+06	125,757	1.232e+07
EQI (9)	214	2.541589	1.001095	0.187	4.09
EU_years	214	43.94	21.11	9	65
Border	214	0.551	0.499	0	1
ppltrst_18	196	5.014	0.863	2.470	7.033
Roadaccessibility	214	76.71	19.47	28.54	111.4
Mount_reg	214	0.287	0.381	0	1
CBCultLan	214	0.243	0.430	0	1
GDP_PPS_Dif	214	10.93	14.12	0	65.57
urban_reg_Dif	214	0.104	0.181	0	1.587
Panel 2006-2021					
EGTC_number	3,424	0.661	1.291	0	10
EGTC_dummy	3,424	0.319	0.466	0	1
N_EGTC_number	3,424	3.014	4.755	0	27
new_EGTC	3,424	0.0333	0.179	0	1
GDP_PPS_pc	3,424	26,449	9,805	6,009	61,875
GFCF_PPS_pc	3,424	5,808	2,586	907.1	20,004
gGDP_PPS_pc	3,424	0.0265	0.0397	-0.167	0.265
Population	3,424	1.968e+06	1.613e+06	124,500	1.232e+07
Observations	214	214	214	214	214

Source: Own calculation.

5. Estimation results and discussion

To test our hypotheses, we perform logistic regressions. Using all regions and starting from a base specification *(*

---

9 In line with the environmental Kuznets curve literature (cf. Chu 2021), we rescaled the *EQI* to positive values to account for an inverse U-shaped pattern of *EQI*.

Table 3-*1*), we add variables for hypothesis testing. Regarding the control variables, we find the following results. While *GDP per capita* has no significant connection, *GDP per capita growth* is positively correlated with the probability of having an EGTC in a region, but only with a very small coefficient. In contrast, *GDP per capita gross capital formation* and *population size* have no significant connection. As expected, the *quality of public administration* (EQI) is significantly positively and EQI with a quadratic specification significantly negatively correlated with the likelihood of having an EGTC in a region. Thus, it confirms the findings by Eckardt (2019) on the inverse U-shaped correlation between absorptive capacity and EGTC adoption in a NUTS2 region. The location next to a *land border* is positively correlated to the likelihood of an EGTC being implemented in a border region. This is to be expected since most EGTCs are set up to foster cross-border cooperation, Consistent with theoretical considerations, the *number of years of EU membership* as an indicator of institutional involvement in the EU at the state level is significantly positively related to the adoption of an EGTC. This suggests that there is a territorial hierarchical differentiation. On the one hand, stronger embeddedness of a state in the EU and better institutions at the state level increase the likelihood of the occurrence of institutionalised cross-border cooperation. On the other hand, within a member state an EGTC is more likely to occur in regions that are more peripheral and have poorer institutions.

Regarding *hypothesis 1* on the relationship of s*ocial capital to institutionalised cross-border cooperation*, we indeed find evidence that a region with more social capital has a higher probability of adopting an EGTC. The regional generalized trust level is highly significantly connected to a higher probability of EGTC occurrence, controlling for the other factors mentioned above (

Table 3 - *2*).

Regarding *hypothesis 2 on infrastructural proximity*, we find a positive, but not significant correlation between *road accessibility* of a region and having an EGTC adopted. (

Table 3 - *3*). This finding also holds if the dataset is filtered to include only border regions – however, with a lower level of significance (estimation results available on demand). This suggests that infrastructural connectivity is indeed a factor with a positive link with institutionalised cross-border cooperation, regardless of geographical location. The results are confirmed when testing for both hypotheses together (

Table 3 - *4*). The models improve regarding *AIC*, *BIC* and *Pseudo R2* with the additional independent variables.

Table 3: Hypotheses 1 and 2, Logit cross-section 2021, all regions

VARIABLES	(1) odds ratio	(2) **H1** odds ratio	(3) **H2** odds ratio	(4) **H1 and H2** odds ratio
EGTC_dummy				
GDP_PPS_pc	1.000	1.000	1.000	1.000
	(4.01e-05)	(4.71e-05)	(4.04e-05)	(4.86e-05)
gGDP_PPS_pc	2.09e-10	5.68e-09	1.28e-09	8.78e-09
	(3.20e-09)	(9.69e-08)	(1.99e-08)	(1.50e-07)
GFCF_PPS_pc	1.000	1.000	1.000	1.000
	(0.000127)	(0.000160)	(0.000126)	(0.000163)
Population	1.000	1.000	1.000	1.000
	(1.07e-07)	(1.18e-07)	(1.12e-07)	(1.21e-07)
EQI	2.269	2.518	1.815	1.906
	(2.165)	(2.851)	(1.767)	(2.225)
EQI^2	0.682*	0.594**	0.696*	0.615**
	(0.136)	(0.143)	(0.140)	(0.150)
EU_years	1.027**	1.029**	1.024*	1.025*
	(0.0129)	(0.0135)	(0.0130)	(0.0137)
Border	3.908***	5.331***	4.003***	5.507***
	(1.323)	(2.000)	(1.367)	(2.093)
ppltrst_18		**2.705***		**2.665***
		(0.906)		(0.894)
roadaccessibility			**1.019**	**1.018**
			(0.0124)	(0.0138)
Constant	1.479	0.0240	0.809	0.0152*
	(2.393)	(0.0558)	(1.363)	(0.0358)
Pseudo R2	0.1843	0.2185	0.1923	0.2251
AIC	259.249	232.0929	258.8789	232.2866
BIC	289.5427	264.874	292.5387	268.3458
Observations	214	196	214	196

seEform in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Own calculation.

Following Bittmann (2019, p. 130) we run model misspecification tests with the Stata Tool "collin" to control for multicollinearity and "linktest" to test for unnecessary or missing explanatory variables. Regarding multicollinearity VIF values for all variables are well below 10, so that we do not find arguments against our models in line with Bittmann (*Appendix Table A.3*). Also, all simple correlation coefficients are smaller than 0.7 (estimates available on request). In addition, according to the "linktest" procedure, which provides significant hat-values and insignificant hatsquare-values for all specifications, our model specifications seem

not to suffer from either unnecessary or missing explanatory variables (estimates available on request).

Hypotheses 3, 4, 6, and 7 apply explicitly to particular characteristics of border regions and their association with EGTC introduction. Thus, *Table 4* provides the estimation results for the sample including only border regions. Regarding *geographical proximity*, we cannot confirm *hypothesis 3* that *mountainous land-border regions* have a lower probability of adopting an EGTC compared to less mountainous border regions. Rather, the probability of having an EGTC adopted is 4.05 times higher in a mountainous border region (*Table 4 - 1*). Thus, connectivity and infrastructure seem to be so well developed that physical borders conditioned by mountainous terrain no longer play a central obstacle to cross-border cooperation in the 21st century. Moreover, it could be that similar geographic conditions create similar problems that are addressed through cooperation across borders, indeed increasing the probability of institutionalised cross-border cooperation. However, more detailed research with actor-level data is needed to evaluate this claim.

As regards *hypothesis 4* on *cultural proximity* as proxied by a *common language* of a border region to neighbouring regions abroad, we find evidence that this characteristic increases the probability of having an EGTC adopted by a factor of 4.3 (*Table 4 - 2*). Thus, as hypothesised a common language across border regions could imply a cross-border cultural space which is empirically highly significant as a central determinant of institutionalized cross-border cooperation. These results hold even if hypotheses 3 and 4 are tested simultaneously (results on request).

Regarding our hypotheses on the link of *relative differences between adjacent border regions* for cross-border cooperation in *hypotheses 6* and *7*, we find no evidence that they have a connection with the probability of an EGTC being implemented. While the odds ratio for *economic disparities* is smaller than 1 indicating the hypothesised direction (*Table 4 - 3*), the odds ratio of *agglomeration structure* of a border region to neighbours abroad is higher than 1 correlating with an even decreased probability for institutionalised cross-border cooperation via the EGTC the more similar border regions are in this respect. However, both correlations are not significant (*Table 4 - 4*). Accordingly, the adoption of an EGTC does not seem to be driven by regions having the same problems due to similar structures or by problems being complementary. Nevertheless, it might also be that we may not be able to identify those factors based on the structure of the data that is at our disposal.

Regarding the control variables, the findings of the full sample above are confirmed, with the absorptive capacity of public administration playing an even more important role in border regions.

Table 4: Hypotheses 3, 4, 6 and 7, Logit cross-section, 2021, only border regions

	(1) **H3**	(2) **H4**	(3) **H6**	(4) **H7**
VARIABLES	odds ratio	odds ratio	odds ratio	odds ratio
	EGTC_dummy			
GDP_PPS_pc	1.000	1.000	1.000	1.000
	(6.90e-05)	(6.75e-05)	(6.55e-05)	(6.72e-05)
gGDP_PPS_pc	320,005	0.525	456.8	677.1
	(7.098e+06)	(11.99)	(10,113)	(14,873)
GFCF_PPS_pc	1.000	1.000	1.000	1.000
	(0.000204)	(0.000215)	(0.000200)	(0.000199)
Population	1.000	1.000	1.000	1.000
	(2.10e-07)	(2.06e-07)	(1.95e-07)	(1.95e-07)
EQI	13.64*	15.71*	16.00*	17.07*
	(20.58)	(24.68)	(25.04)	(25.85)
EQI^2	0.483**	0.468**	0.461**	0.462**
	(0.150)	(0.148)	(0.144)	(0.142)
EU_years	1.051**	1.029	1.039**	1.038**
	(0.0213)	(0.0191)	(0.0189)	(0.0188)
Mount_reg	**3.475***			
	(2.483)			
CBCultLan		**4.342***		
		(2.287)		
GDP_PPS_Dif			**0.997**	
			(0.0171)	
urban_reg_Dif				**1.464**
				(1.723)
Constant	0.0763	0.174	0.130	0.112
	(0.204)	(0.480)	(0.376)	(0.301)
Pseudo R2	0.1641	0.2004	0.1430	0.1436
AIC	145.4136	139.8778	148.6204	148.5401
BIC	170.3497	164.8139	173.5565	173.4762
Observations	118	118	118	118

seEform in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Own calculation.

To test *hypothesis 5 regarding spatial proximity* by *spill-overs* according to which the probability that an EGTC is introduced for the first time in a certain region is higher the more EGTCs are already existing in adjacent regions, we run panel logit regressions with random

effects (*Table 5 - 1*). In contrast to our hypothesis, our findings suggest that the probability that an EGTC is introduced for the first time in a certain region is smaller when there had been already EGTCs in adjacent regions in the previous period. Therefore, we cannot account for positive spatial spill-overs. Instead, a higher number of EGTCs in neighbouring regions appear to reduce the opportunity to be part of an EGTC in a region as a new partner. This might be due to saturation effects or because partnerships between regions are based on such strong binding forces, such as cultural proximity (see above), that neighbouring regions are left out of new EGTCs.

Table 5: Hypothesis 5, Logit panel random effects, 2006-2021, all regions

	(1) **H5**	(2) **H5**	(3) **H5**	(4) **H5**
VARIABLES	odds ratio	odds ratio	odds ratio	odds ratio
		new_EGTC		
GDP_PPS_pc	1.000	1.000	1.000	1.000
	(2.53e-05)	(2.81e-05)	(2.54e-05)	(2.56e-05)
gGDP_PPS_pc	0.00576**	0.0198	0.0163*	0.0209*
	(0.0125)	(0.0490)	(0.0359)	(0.0456)
GFCF_PPS_pc	1.000	1.000	1.000	1.000*
	(9.57e-05)	(0.000107)	(9.59e-05)	(9.96e-05)
Population	1.000	1.000	1.000	1.000
	(5.93e-08)	(6.09e-08)	(5.72e-08)	(5.77e-08)
Border	2.057***	2.344***	2.198***	1.587*
	(0.434)	(0.541)	(0.466)	(0.387)
EU_years	1.008	1.007	1.010*	1.009
	(0.00558)	(0.00586)	(0.00576)	(0.00576)
L.N_EGTC_number	**0.892***	**0.896***	**0.869***	**0.853***
	(0.0287)	(0.0292)	(0.0306)	(0.0305)
ppltrst_18		0.910		
		(0.142)		
Mount_reg			2.632***	2.543***
			(0.654)	(0.628)
CBCultLan				2.167***
				(0.531)
Constant	0.0428***	0.0515***	0.0269***	0.0339***
	(0.0153)	(0.0356)	(0.0103)	(0.0131)
Observations	3,424	3,136	3,424	3,424
Number of _ID	214	196	214	214

Source: Own calculation.

The panel results are robust to numerous robustness checks (*Table 5 - 2, 3, 4*), and withstand specification changes. Regarding the proximity characteristics, both a common language and being a more mountainous region show a significantly positive connection with having an EGTC adopted. This is in line with the results from the cross-sectional logistic regression, while we find no evidence of the generalized trust level being of importance, which is in contrast to the cross-sectional evidence.

For robustness checks we also excluded EGTCs for which we could not identify a clear focus on cross-border cooperation. This was the case for 18 NUTS2 level regions. However, our estimations showed no major differences in the results (which are available on request).

6. Conclusions

Some recent surveys found that the main obstacles to cross-border cooperation are institutional barriers, language differences, difficulties in accessibility, economic disparities, and social discrepancies (European Commission, 2015; Medeiros, 2018; Svensson and Balogh, 2018). While the EGTC provides a framework for overcoming at least some of the legal and administrative obstacles, it is not clear whether its introduction itself is affected by the stated obstacles to cross-border cooperation. Therefore, in this paper, we aimed to enrich the empirical literature on evidence about the structural characteristics of NUTS2 level regions influencing the adoption of the EGTC as a cross-border governance structure. Using a unique dataset at the NUTS2 level, we managed to gain additional insights regarding the characteristics of a (border) region that drive or hinder the adoption of an EGTC.

In particular, we do find evidence that *social capital -* more precisely the level of generalized trust level in a region - is a highly significantly positive connected to the probability of an EGTC being introduced. A higher level of generalized trust in a region seems to decrease frictions for new regulations and ceteris paribus increases the probability of an EGTC being introduced in a region. In addition, a positive connection between *road accessibility* of a region and the probability of at least one EGTC on its territory is found. This indicates that infrastructural connectivity is indeed a factor with a positive association with institutionalized cross-border cooperation, regardless of geographical location. Furthermore, we find evidence that a *common language* among adjacent border regions also significantly increases the likelihood of institutional cooperation c. p.. Language common on both sides of a border is a significant enabling factor, signalling easier communication and – often due to a common history – also a better understanding of actors engaged in cross-border cooperation. Thus, it

can be seen as main driver for introducing an EGTC. However, while better accessibility plays an important role in overcoming obstacles to institutionalized cross-border cooperation, this does not hold for geographical barriers like regions being characterized by *mountainous areas adjacent to borders*. Contrary to our expectations, such regions show a higher likelihood of an EGTC being adopted. This might be due to the fact that similar geographic conditions create similar challenges. As a consequence, public actors in such regions have already embraced the EGTC as a means to assist in overcoming them. Finally, as regards both *economic disparities* and *discrepancies in agglomeration structure* we find no evidence that they are connected with the implementation of institutionalised cross-border cooperation in the form of the EGTC, neither positively nor negatively. Therefore, adopting an EGTC seems not to be affected by obstacles resulting from economic and social discrepancies. This is the more important since the EGTC is one of the means that should tackle exactly the structural problems of border regions resulting in such disparities.

Lastly, we find no evidence that there are positive *spill-overs between regions* regarding the adoption of an EGTC. Contrary to our hypothesis, our findings suggest that the probability that an EGTC is introduced for the first time in a certain region is smaller when there had been already EGTCs in adjacent regions in the previous period. Why this is the case, needs to be discussed in more detail in future studies.

In addition our results confirmed earlier findings by Eckardt (2019) on the positive correlation between being a border region, length of EU membership and the positive absorptive capacity of public administration.

All in all, our research extends the knowledge of the factors that affect the adoption of the EGTC for institutionalised cross-border cooperation. In addition, we contribute to the empirical literature by building a valuable dataset and introducing novel indicators for characterizing regions in the cross-border context. Our empirical evidence provides a starting point for multiple new explanatory strands for cross-border cooperation. Those results can be the foundation of further in-depth analyses.

This study looked at the meso-level for analysing the adoption of the EGTC in border regions. It refers to regional characteristics at the NUTS2 level that might cause obstacles for institutionalised cross-border cooperation. By this, we tested for the relationship of some of the main restrictions on the adoption of the EGTC. However, our study does not take into account

the micro-level. So, it cannot analyse what the individual drivers of adopting an EGTC for cross-border cooperation are. Such an actor-centred approach would be desirable since actually implementing an EGTC is a rather complex endeavour. The local agents, their objects, motivation, and restrictions are certainly the most important success factors for actually introducing an EGTC. In addition, long-term and already well-established cross-border relations might also be a crucial driver for establishing and successfully operating EGTCs.

Accordingly, for further empirical investigations, it would be beneficial to use a dataset containing microdata alongside the higher-level structural data on regions to account for the association of actor-centred factors. In addition, a dataset that allows estimating a gravity model would be useful. It would allow investigating factors influencing the precise connection between regions or EGTC partners. While we used the NUTS2 level mainly due to data restrictions, it would also be desirable to see whether data at the NUTS3 level would show different results. Since the classification of regions according to the NUTS nomenclature does not make any statements about functional or structural differences between regions but relies on population size, the NUTS3 level could allow for a more differentiated picture. Moreover, it would be interesting to analyse whether and what other types of already institutionalised cross-border cooperation do positively affect the adoption of the EGTC, thus enabling synergies in institution building. Further analysis is also required to establish whether the existence and extent of a cross-border regional innovation system positively affects the adoption and thus the diffusion of the EGTC. Finally, the development of social capital needs to be researched more broadly.

Regarding policy implications of our analysis, our empirical findings on cultural proximity point to putting priority on teaching the language of the neighbouring country in border regions to increase proximity and understanding. This, and the promotion of cross-border exchange, should result in positive feedback effects leading to an increase in social capital over time. Regional connectedness is a crucial issue with infrastructure in rural border areas allowing for multiple positive effects, including such on cross-border cooperation. Finally, we argue that informal factors at the regional level need to be taken into account more strongly in regional policy making.

Appendix

Table A.1: Hypotheses, variables, expected signs and results

Hypotheses	Variables	Expected sign	Results
(1) Social capital			
Hypothesis 1: The probability of adopting an EGTC increases the higher the *generalized trust level of citizens* in a region.	*Ppltrst_18*	pos./ odds ratio >1	pos.**/ odds ratio >1
(2) Proximity (infrastructural, geographical, cultural, spatial)			
Hypothesis 2: The probability of adopting an EGTC increases the better the *road accessibility* in a region.	*Roadaccessibility*	pos./ odds ratio >1	pos./ odds ratio >1
Hypothesis 3: The probability of adopting an EGTC in a border region increases the less *mountainous* an adjacent border region.	*Mount_reg*	neg./ 0> odds ratio<1.	pos.*/ odds ratio >1
Hypothesis 4: The probability of adopting an EGTC in a border region increases when it has *a common language* with at least one adjacent border region in a neighbouring country.	*CBCultLan*	pos./ odds ratio >1	pos.*** / odds ratio >1
Hypothesis 5: The probability of adopting an EGTC in a region for the first time increases the more *EGTCs are already in place in adjacent regions* across the national border.	*N_EGTC_number$_{i,t-1}$*	pos.	neg.**/ 0> odds ratio<1 *
(3) Relative differences between regions			
Hypothesis 6: The probability of adopting an EGTC in a border region increases the lower economic disparities are between a border region and adjacent border regions in a neighbouring country.	*GDP_PPS_Dif*	Neg / 0> odds ratio<1.	neg./ns/ / 0> odds ratio<1
Hypothesis 7: The probability of adopting an EGTC in a border region increases the less different *a border region's agglomeration structure* is compared to adjacent border regions in a neighbouring country.	urban_reg_Dif	Neg / 0> odds ratio<1	pos./ns / odds ratio >1

*, **, *** *p< 0.1, 0.5, 0.01; ns =* not significant

Source: Own composition.

Table A.2: Definition of variables

Dependent variable		
EGTC_dummy	Dummy for at least one EGTC in a NUTS2 region	Own coding
New_EGTC	Dummy for the first time an EGTC is introduced in one NUTS 2 region in one year	Own coding
Control variables		
GDP_PPS_pc	GDP per capita with Purchasing Power Standard	ARDECO online, updated: 5 March 2020, downloaded: 20.04.2020
gGDP_PPS_pc	Growth rate of GDP per capita with Purchasing Power Standard	Own calculation based on GDP_PPS_pc
GFCF_PPS_pc	Gross Fixed Capital Formation per capita	ARDECO online, updated: 5 March 2020, downloaded: 20.04.2020
Population	Population	ARDECO online, updated: 5 March 2020, downloaded: 20.04.2020
EQI	Quality of Governance Index 2021 (technical details: The QoG Institute, 2021, p. 21)	The Quality of Governance Institute https://www.gu.se/en/quality-government/qog-data/data-downloads/european-quality-of-government-index Charron *et al.* (2022)
EU_years	years of a region being part of the EU as of 2022	Own coding, https://en.wikipedia.org/wiki/Member_state_of_the_European_Union
Border	Dummy for land-border regions	own coding based on Eurostat shapefile
Independent variables for hypotheses testing		
ppltrst_18	average outcome by NUTS-2 region of the question "most people can be trusted or you can't be too careful" - technical description in footnote above [1],	European Social Survey ESS 2018

roadaccesability	Share of population in a 120 km radius accessible by road within 1h30	European Regional Competitiveness Index' raw data; https://ec.europa.eu/regional_policy/en/information/maps/regional_competitiveness/
Mount_reg	Border region with average NUTS3 > 50 % surface mountains, 50 % pop, or both	Own calculation based on Eurostat NUTS 3 coding; https://ec.europa.eu/eurostat/cache/RCI/#?vis=mountain.typology&lang=en
CBCultLan	Dummy for a border region with a common language with an adjacent region in a neighbouring country	own coding based on European Language Map https://commons.wikimedia.org/wiki/File:Simplified_Languages_of_Europe_map.svg
GDP_PPS_Dif	***cross-border economic gap*** relative difference of GDP per capita with purchasing power parity of a border region from the mean of adjacent regions in a neighbouring country as percentage of the GDP in the region, compare for the calculation of **cross-border urbanization degree gap**	Own calculation based on ARDECO online, compare for GDP_PPS_pc
urban_reg_Dif	***cross-border urbanization degree gap*** relative difference of urbanization of a border region from the mean of adjacent regions in a neighbouring country. Calculation: degree of urbanization on NUTS 3-level -scaled 3 (rural) - 1 (urban) *rural_reg*. Aggregation to NUTS2 level - mean degree of urbanization on NUTS 2 level as the average of NUTS 3 regions within the region, value calculated for every NUTS 2 border region (*rural_reg)*. *mcbn_urban_reg=. mean of* rural_reg for neighboring border regions abroad Urban_reg_Dif=(rural_reg-mcbn_urban_reg)/ rural_reg Example: highest value for urban_reg_Dif for SK01=1.58: rural_reg=1, *mcbn_urban_reg=2.58*	Own calculation based on Eurostat NUTS 3 coding, https://ec.europa.eu/eurostat/cache/RCI/#?vis=urbanrural.urb_typology&lang=en

	The Bratislava-NUTS2 region is bordering with very rural regions in Austria and Hungary, therefore it has the highest cross-border urbanization degree gap.	

Source: Own composition.

Table A.3: Collinearity Diagnostics for cross-section in 2021

Variable	VIF	SQRT-VIF	Tolerance	R- Squared
GDP_PPS_pc	7.45	2.73	0.1343	0.8657
gGDP_PPS_pc	2.54	1.6	0.393	0.607
GFCF_PPS_pc	6.51	2.55	0.1536	0.8464
Population	1.37	1.17	0.7301	0.2699
eqi21_n2	2.89	1.7	0.3463	0.6537
EU_years	2.46	1.57	0.4066	0.5934
Border	1.16	1.07	0.8656	0.1344
ppltrst_18_N2_wght	2.23	1.49	0.4484	0.5516
Roadaccessibility	2	1.41	0.5012	0.4988

Source: Own calculations.

References

Augère-Granier, M.-L. and McEldowney, J. (2021), "*EU rural development policy. Impact, challenges and outlook*", available at: https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/690711/EPRS_BRI(2021)690711_EN.pdf (accessed 31 August 2022).

Beck, T. and Laeven, L. (2006), "Institution building and growth in transition economies", *Journal of Economic Growth*, Vol. 11 No. 2, pp. 157–186.

Beugelsdijk, S. and van Schaik, T.H.M. (2005), "Social capital and growth in European regions. An empirical test", *European Journal of Political Economy*, Vol. 21 No. 2, pp. 301–324.

Bittmann, F. (2019), *Stata: A really short introduction*, De Gruyter Oldenbourg, Berlin, Boston.

Charron, N., Lapuente, V. and M. Bauhr (2021), Sub-national quality of government in EU Member States: Presenting the 2021 European Quality of Government Index and its relationship with Covid-19 indicators, University of Gothenburg: *The QoG Working Paper Series* 2021:4.

Charron, N., Lapuente, V., Bauhr, M. and Annoni, P. (2022), "Change and Continuity in Quality of Government", *Investigaciones Regionales - Journal of Regional Research*, Vol. 53, pp. 5–23.

Chu, L.K. (2021), "Economic structure and environmental Kuznets curve hypothesis: new evidence from economic complexity", *Applied Economics Letters*, Vol. 28 No. 7, pp. 612–616.

Committee of the Regions (2022), "*List of European Groupings of Territorial Cooperation*", 20/01/2022, available at https://cor.europa.eu/en/our-work/Documents/Official_List_of_the_E GTCs.pdf (accessed 15 December 2022)

Committee of the Regions (sev. years), "*EGTC Monitoring Report yyyy*", available at: https://cor.europa.eu/en/our-work/Pages/egtc.aspx#Studies (accessed 51 December 2022).

Eckardt, M. (2019), "Cross-border cooperation via the EGTC – A study on its main drivers of adoption at the regional level", *Andrassy Working Papers in Economics and Business Administration* No.42 available at: https://www.andrassyuni.eu/publikationen/cross-border-cooperation-via-the-egtc-a-study-on-its-main-drivers-of-adoption-at-the-regional-level.html (accessed 31 August 2022).

Eckardt, M. and Okruch, S. (2019), "The EGTC as a new tool for Interregional and cross-border cooperation – A quantitative analysis", *NISPAcee 2019 e-Proceedings*, available at: https://www.nispa.org/files/conferences/2019/e-proceedings/e-proceedings-NISPAcee-Conference-2019.html (accessed 31 August 2022).

Eckardt, M. and Okruch, S. (2021), "The legal innovation of the European Grouping of Territorial Cooperation and its impact on systems competition", in Masson, A. and Robinson, G. (Eds.), *Mapping Legal Innovation*, Springer International Publishing, Cham, pp. 331–355.

ESPON (2007), "*Cross-border cooperation - Cross-thematic study of INTERREG and ESPON activities*", available at: https://www.espon.eu/sites/default/files/attachments/Cross-Border_Cooperation_web.pdf (accessed 31 August 2022).

European Commission (2015), "*Cross-border cooperation in the EU. Flash Eurobarometer 422*", available at: http://publications.europa.eu/resource/cellar/58acb2f2-d08c-11e5-a4b5-01aa75ed71a1.0001.01/DOC_1 (accessed 2 September 2022).

European Commission (2016), "Overcoming obstacles in border regions: summary report on the online public consultation, 21 September – 21 December 2015", available at: https://ec.europa.eu/regional_policy/sources/consultation/overcoming-obstacles-border-regions/results/overcoming_obstacles_en.pdf (accessed 31 August 2022).

European Social Survey ERIC (ESS ERIC) (2019), *European Social Survey (ESS), Round 9 - 2018: Data file edition 3.1. Sikt*, available at: https://ess-search.nsd.no/en/study/bdc7c350-1029-4cb3-9d5e-53f668b8fa74 (accessed 30 August 2022).

Eurostat (2020): Territorial typologies manual - urban-rural typology, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Territorial_typologies_manual_-_urban-rural_typology (accessed 6 December 2022)

Eurostat (2022): NUTS - Nomenclature of territorial units for statistics. Background. (accessed 6 December 2022)

Evrard, E. and Engl, A. (2018), "Taking stock of the European Grouping of Territorial Cooperation (EGTC): From policy formulation to policy implementation", in Medeiros, E.

(Ed.), *European Territorial Cooperation*, *The Urban Book Series*, Springer International Publishing, Cham, pp. 209–227.

Hataley, T. and Leuprecht, C. (2018), "Determinants of cross-border cooperation", *Journal of Borderlands Studies*, Vol. 33 No. 3, pp. 317–328.

Jaansoo, A. (2019), "*Provision of services across international borders factors driving cooperation of subnational governments in Europe*", 10.3990/1.9789036547581.

Lange, E. and Pires, I. (2018), "The Role and Rise of European Cross-Border Entities", in Medeiros, E. (Ed.), *European Territorial Cooperation*, *The Urban Book Series*, Springer International Publishing, Cham, pp. 135–149.

Lundén, T. (2018), "Border regions and cross-border cooperation in Europe. A theoretical and historical approach", in Medeiros, E. (Ed.), *European Territorial Cooperation*, *The Urban Book Series*, Springer International Publishing, Cham, pp. 97–113.

Medeiros, E. (2018), "Should EU cross-border cooperation programmes focus mainly on reducing border obstacles?", *Documents d'Anàlisi Geogràfica*, Vol. 64 No. 3, p. 467.

Medve-Bálint, G. and Svensson, S. (2012), "Explaining coverage: why local governments join (or not join) Euroregions in Central and Eastern Europe", in Klatt, M. and Andersen, D. J. (Hg.) (Ed.), *The Border Multiple, The Practicing of Borders between Public Policy and Everyday Life in a Re-scaling Europe*, Routledge, pp. 219–244.

Muringani, J. (2022), "*Trust as a catalyst for regional growth in a decentralized Europe: The interplay between informal and formal institutions in driving economic growth*", pp. 1–21, 10.1111/jors.12594.

Muringani, J., Fitjar, R.D. and Rodríguez-Pose, A. (2021), "Social capital and economic growth in the regions of Europe", *Environment and Planning A: Economy and Space*, Vol. 53, pp. 1412-1434.

Narula, R. (2004), *Understanding absorptive capacities in an "innovation systems" context: Consequences for economic and employment growth*, MERIT-Infonomics research memorandum series, 2004-003, MERIT, Maastricht.

Parente, F. (2019), "Inequality and social capital in the EU regions: a multidimensional analysis", *Regional Studies, Regional Science*, Vol. 6 No. 1, pp. 1–24, 10.1080/21681376.2018.1558105.

Regulation 2006, "Regulation (EC) No 1082/2006 of the European Parliament and of the Council of 5 July 2006 on a European Grouping of Territorial Cooperation (EGTC)", *Official Journal of the European Union L 210/19*.

Regulation 2013, ""Regulation (EU) No 1302/2013 of the European Parliament and of the Council of 17 December 2013 amending Regulation (EC) No 1082/2006 on a European Grouping of Territorial Cooperation (EGTC) as regards the Clarification, Simplification and Improvement of the Establishment and Functioning of such Groupings"", *Official Journal of the European Union L 347/303*.

Rogers, E.M. (1962), *Diffusion of innovations*, The Free Pr, New York.

Setnikar Cankar, S., Seljak, J. and Petkovšek, V. (2014), "Factors that influence cross-border cooperation between businesses in the Alps–Adriatic region", *Economic Research-Ekonomska Istraživanja*, Vol. 27 No. 1, pp. 304–319.

Sohn, C. (2018), "Cross-border regions", in Paasi, A., Harrison, J. and Jones, M. (Eds.), *Handbook on the geographies of regions and territories*, *Research handbooks in geography series*, Edward Elgar Publishing, Cheltenham, UK, Northampton, MA, USA, pp. 298–310.

Svensson, S. (2013a), "Forget the policy gap: why local governments really decide to take part in cross-border cooperation initiatives in Europe", *Eurasian Geography and Economics*, Vol. 54 No. 4, pp. 409–422.

Svensson, S. (2013b), "*Social capital and governance in European borderlands: a comparative study of Euroregions as policy actors*", Central European University - Doctoral School of Political Science, Public Policy and International Relations, Budapest Hungary.

Svensson, S. and Balogh, P. (2018), "Limits to integration: Persisting border obstacles in the EU", in Medeiros, E. (Ed.), *European Territorial Cooperation*, *The Urban Book Series*, Springer International Publishing, Cham, pp. 115–134.

Tabellini, G.E. (2010), "Culture and institutions. Economic development in the regions of Europe", *Journal of the European Economic Association*, Vol. 8 No. 4, pp. 677–716.

The QoG Institute (2021), "*The European Quality of Government Index 2021 Codebook*", available at: https://www.qogdata.pol.gu.se/data/qog_eqi_codebook_21.pdf.

Wong Villanueva, J.L., Kidokoro, T. and Seta, F. (2020), "Cross-border integration, cooperation and governance: A systems approach for evaluating "good" governance in cross-border regions", *Journal of Borderlands Studies*, pp. 1–24, 10.1080/08865655.2020.1855227.

ANDRÁSSY WORKING PAPER SERIES

IN ECONOMICS AND BUSINESS ADMINISTRATION

50   Florian Bucher. Martina Eckardt, 2022. "The EGCT as a Governance form for Cross-Border Cooperation – a Spatial Analysis of its Critical Success Factors"

49   Adrian Ade. 2022. „The systematic view on literature – a bibliometric analysis of the research front."

48   Alina Alexenko. 2022. „Geschäftsberichte als ein Forschungsobjekt und die Relevanz von Behavioral Economics für die Unternehmensberichterstattung."

47   Tamás Ginter. 2022. „Lockdown policies: a review of political effects on restrictive measures."

46   Jörg J. Dötsch. 2021. „Theorizing emergence in framing complexity economics. A Reply."

45   Jörg J. Dötsch. 2021. „Houses, but in what order? Asymmetric recovery in Hungary's residential property market after the crisis."

44   Storch, Rainer. 2020. „Gemeinsamkeiten und Differenzen der Motive von Führungspersonen gewinnrealisierender und dauerdefizitärer Monopolunternehmen"

43   Wontke, Christoph. 2020. „Historische Kapitalanlageperformance deutscher Lebensversicherer im Vergleich zum Kapitalmarkt: Sind die Lebensversicherer besser als ihr Ruf?"

42 Eckardt, Martina. 2019. „Cross-Border Cooperation via the EGTC – A Study on its Main Drivers of Adoption at the Regional Level"

41 Sehic, Jutta. 2019. „Networking and knowledge transfer – Returnee entrepreneurship in the Western Balkans. Research report Bosnia and Herzegovina"

40 Jürgens, Jonas. 2019. „Die Agenda zur besseren Rechtsetzung der Juncker-Kommission: Wirksamer Beitrag zur Stärkung der Union?"

39 Dörstelmann, Felix A. 2019. „Wettbewerb zwischen PEPP und PPP – Zur theoretische Modellierung des potenziellen Wettbewerbs zwischen pan-europäischen und nationalen Altersversorgeprodukten"

38 Sehic, Jutta 2018. „Novelty and links in innovative firms' networks: An analysis of SME in Central and South Eastern Europe"

37 Eckardt, Martina and Stefan, Okruch 2018. „The Legal Innovation of the European Grouping of Territorial Cooperation and its Impact on Systems Competition"

36 Wickström, Bengt-Arne, Templin, Torsten and Gazzola, Michele 2017. „An economics approach to language policy and linguistic justice"

35 Megyeri, Eszter 2016. „Altersarmut und Wohneigentum in der EU – Eine Analyse mit EU-SILC 2014 Daten"

Frühere Ausgaben sind in der Reihe:

ANDRÁSSY WORKING PAPER SERIES / ISSN 1589-603X

erschienen**:**

XXXIV Dötsch, Jörg. 2015. „Building a knowledge economy: is Hungary turning the right screw?"

XXXIII Hornuf, Lars und Lindner, Julia 2014. „The End of Regulatory Competition in European Law?"

XXXII Eckardt, Martina 2014. „The Impact of ICT on Policies, Politics, and Polities – An Evolutionary Economics Approach to Information and Communication Technologies (ICT)"

XXXI Eckardt, Martina 2014. „Legal Form and Internationalization of Small and Medium_Sized Enterprises in the EU"

XXX Dötsch, Jörg 2013. „Ökonomik und Emergenz. Arbeitspapier zum Emergenzbegriff der Heterodoxie"

XXIX Dötsch, Jörg 2013. „Überlegungen zu Prozessen endogener Destabilisierung von Wettbewerbswirtschaften"

XXVIII Eckardt, Martina und Kerber, Wolfgang 2013. „Horizontal and Vertical Regulatory Competition in EU Company Law: The Case of the European Private Company (SPE)"

XXVII Eckardt, Martina. 2012. „The Societas Privata Europaea – Could it Promote the Internatinalization of Small and Medium-Sized Enterprises?"

XXVI Ebert, Werner und Eckardt, Martina. 2011. „Wirtschafts- und finanzpolitische Koordinierung in der EU – Erfahrungen aus einem Jahrzehnt Politikkoordinierung"

XXV   Eckardt, Martina und Räthke-Döppner, Solvig. 2008. „The Quality of Insurance Intermedieary Services – Empirical Evidence for Germany"

XXIV Okruch, Stefan und Alexander Mingst. 2008. „Die Kammerorganisation aus evolutorischer Sicht".

XXIII Mingst, Alexander. 2008. „Politische Prozesse und die Rolle von Ideologien: Sinnvolle Geschichten in einer ungewissen Welt".

XXII Mingst, Alexander. 2008. „Evolutionary Political Economy and the Role of Organisations".

XXI   Mingst, Alexander. 2008. „The Organizational Underpinnings of Innovation and Change in Health Care".

XX   Okruch, Stefan. 2007. "The 'Open Method of Coordination' and its Effects: Policy Learning or Harmonisation?

XIX   Okruch, Stefan. 2006. "Die 'Offene Methode der Koordinierung': Gefahr schleichender Harmonisierung oder Chance für Politiklernen?"

XVIII Okruch, Stefan. 2006. "Values and Economic Order: In Search of Legitimacy"

XVII Okruch, Stefan. 2006. „Die EU-Wettbewerbspolitik zwischen Einheitlichkeit und Vielfalt – Anmerkungen aus ordnungsökonomischer Sicht"

XVI   Beckmann, Klaus B. 2006. "Tax evaders keep up with the Joneses"

XV   Margitay-Becht András 2005 "Inequality and Aid. Simulating the correlation between economic inequality and the effect of financial aid"

XIV   Beckmann, Klaus B. 2005. "Tax competition and strategic complementarity"

XIII   Meyer, Dietmar – Lackenbauer, Jörg. 2005 „EU Cohesion Policy and the Equity-Efficiency Trade-Off: Adding Dynamics to Martin's Model"

XII   Chiovini, Rita und Zsuzsanna Vetõ. 2004. „Daten und Bemerkungen zu den Disparitäten im Entwicklungsstand ausgewählter Länder"

XI   Alfred, Endres. 2004 „Natürliche Ressourcen und nachhaltige Entwicklung"

X   Bartscher, Thomas, Ralph Baur and Klaus Beckmann. 2004 „Strategische Probleme des Mittelstands in Niederbayern"

IX   Arnold, Volker – Hübner, Marion. 2004. „Repression oder Umverteilung - Welches ist der beste Weg zur Erhaltung der Funktionsfähigkeit marktwirtschaftlicher Systeme? - Ein Beitrag zur Theorie der Einkommensumverteilung."

VIII Okruch, Stefan. 2003. „Verfassungswahl und Verfassungswandel aus ökonomischer Perspektive - oder: Grenzen der konstitutionenökonomischen Suche nach der guten Verfassung."

VII   Meyer, Dietmar: „Humankapital und EU-Beitritt – Überlegungen anhand eines Duopolmodells."

VI   Okruch, Stefan. 2003. „Evolutorische Ökonomik und Ordnungspolitik – ein neuer Anlauf".

V   Arnold, Volker. 2003. „Kompetitiver vs. kooperativer Föderalismus: Ist ein horizontaler Finanzausgleich aus allokativer Sicht erforderlich?'

IV   Balogh, László – Meyer, Dietmar. 2003. „Gerechtes und/ oder effizientes Steuersystem in einer Transformationsökonomie mit wachsendem Einkommen'.

III   Beckmann, Klaus B. 2003. „Tax Progression and Evasion: a Simple Graphical Approach".

II   Beckmann, Klaus B. 2003. „Evaluation von Lehre und Forschung an Hochschulen: eine institutenökonomische Perspektive".

I   Beckmann, Klaus B. and Martin Werding. 2002. „Two Cheers for the Earned Income Tax Credit".