Perception and Evaluation of Regional and Cohesion Policies by Europeans and Identification with the Values of Europe

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Deliverable 4.2

Report on the synergies between EU Cohesion Policy and rural development policies

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Deliverable 4.2 Report on the synergies between EU Cohesion Policy and rural development policies

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1. Introduction

This report will analyse the interaction between regional Cohesion Policy (CP) and rural, development and agricultural policies (RP) of the EU. The analysis will explore if and eventually to what extent (i) a synergy arises between the two different (set of) policies in terms of both (ii) the effects and (iii) the determinants of the allocation of funds and subsequent actual expenditure in the 2007-2013 programming period.

Indeed, the intermingled issues recalled above and their spatial distribution are crucial in the process of shaping the citizens' perception of the EU. This is confirmed, for example, by the sharp divide between cities and the countryside in the preferences about Brexit as expressed in the June 2016 referendum. In which, the countryside expressed a strong preference about Brexit with 55% voting for Brexit, while cities such as Bristol, Glasgow, Cardiff, Liverpool and London expressed a strong preference for remaining in the EU.

Citizens' preferences apart, there has been an important debate about the proper policy design with respect to spatial development characteristics. The approach to regional policy has remained almost unchanged over the last few decades (Lagendijk and Conford, 2000; Pike et al., 2006) using a paradigm based on 1950s growth and development theories. Debate about the link between place characteristics and policy design has emerged under the pressure of the more heterogeneous economic reality stemming from globalization (Roberts, 1993). The key concern is the extent to which the policy design should reflect the uneven spatial distribution of people, infrastructure, and resources. A different spatial approach would call for a shift in the

decision-making process, moving away from the "mainly top down, with mixed, integrated, and/or bottom-up approaches virtually ignored" (Barca et al., 2012).

Advocacy for a new approach based on spatial characteristics is based on the following arguments (Barca, 2009): First, different spatial endowments, such as, social, cultural, and institutional factors, will shape the trajectory of the potential for development (Bolton, 1992). Neglecting to consider these different characteristics, in other words being 'space-neutral', provides an uncontrolled space effect that may undermine the intended effect of the policy. Secondly, in order to increase the policy's effectiveness, the (knowledge based) intervention must take into account the causes, the extent, and the channels of relative underdevelopment of a given region.

Nonetheless, the appeal of 'spatially blind' policies has found a renewed momentum. The narrative is theoretically based on agglomeration effects (World Bank, 2009) for which spatially-blind policies (or rather 'people-based' policies) can promote equal opportunities and improve productivity via spatial adjustment. In turn, promoting economic convergence across geographical areas.

Within this theoretical framework, the EU approach has been inspired by different positions. The 2004 Sapir Report An Agenda for a Growing Europe came to conclusions that were more along the lines of the 'spatial-blind' policies arguing that the EU Cohesion Policy should primarily target member states rather than subnational regions. However, the Barca (2009) report An Agenda for a Reformed Cohesion Policy pointed out that "there is a strong case, rooted in economic theory and in a political interpretation of the present state of the European

Union, for the Union to allocate a large share of its budget to the provision of European public goods through a place-based development strategy aimed at both core economic and social objectives (p. VII)"

Which paradigm prevails is still questioned and only a limited amount of research has currently been developed on this crucial issue. Building upon Crescenzi et al. (2015), this empirical analysis explores the role of structural factors (i.e. place-based characteristics) in shaping EU policy. The analysis considers the shape of policy in terms of: the allocation of funds; the effects of these allocations; and the interaction between cohesion and agricultural policy.

The latter being a crucial underexplored issue in both the policy design and implementation phase. Indeed, the lesson learnt from a positive analysis on synergies and complementarities between different realms of EU policy could potentially lead to a more efficient use of funding (while governments in Europe are bounded by the fiscal compact) along with a better focussed intervention to address inequality. Furthermore, it would be beneficial in terms of better coordination and coherence between national and regional development programs.

In principle, an intended link between the two policies is stated in the EU objectives. Indeed, the rural development policy aims to help rural regions grow and raise employment and living standards" according to three overarching objectives: improving the competitiveness of agriculture, achieving sustainable management of natural resources and climate action, and a balanced territorial development of rural areas. These objectives are shared by the EU cohesion policy. As a result, the European regional development fund (ERDF) and the European social

fund (ESF) are intended to work to complement the European agricultural fund for rural development (EAFRD).

Overall, a better understanding of the interaction between Cohesion and Rural Policy would certainly contribute towards the goals set by the European Commission (EC) (2013) in Refocusing EU Cohesion Policy for Maximum Impact on Growth and Jobs […] with regard to the 2014-2020 budget. Indeed, a deeper consideration of the above interaction will contribute to (i) "establishing a common strategy for more coordination and less overlap between the European Structural and Investment Funds (ERDF, Cohesion Fund and ESF as the three funds under Cohesion Policy as well as the Rural Development and Fisheries funds)" (EC, 2013) and to (ii) "ensuring that Cohesion Policy is better linked to wider EU economic governance making programmes more consistent with National Reform Programmes (EC, 2013).

Undeniably, the lessons learned in terms of coordination and interaction are potentially able to provide insights also regarding the Investment Plan for Europe (IPE) in order to enhance the overall effect in terms of job creation, economic growth and competitiveness by exploring and taking advantage of synergies both at the European level and at the level of individual Member States and their local governments.

Results show that a significant relationship between aggregated (total) expenditure from CP and RP is not detected in the programming period under consideration. Nonetheless, by disaggregating the policies into more granular measures and taking into account structural place-based characteristics, some evidence of synergy in focussing on more disadvantaged

territories arises between policy categories (for example, between subsidies on crops and energy expenditure). This opens interesting questions about the peculiar policy mix generating such a positive synergy and to what extent eventually the virtuous paradigm can be extended to other policy realms.

2. Testing for synergy: methodological framework

This section provides information about the dataset, research questions, and empirical strategy for analysing the synergy between the EU cohesion and rural policy.

2.1 The dataset.

The analysis uses data on cohesion policy and expenditure on agriculture along with socio-economic indicators used for policy evaluation. The data on CP allocations and expenditure by categories (Business support, Energy, Environment and natural resources, Human resources, IT infrastructure and services, Research and Technology, Social infrastructure, Technical assistance, Tourism & Culture, Transport infrastructure, Urban and rural regeneration, and Other) for the programming period 2007 – 2013 were retrieved from the EU 'InfoRegio' portal and shown in Table 2.1. The data on agriculture expenditure are retrieved from the Farm Accountancy Data Network (FADN). The indicators extracted from the dataset are: Total subsidies - excluding on investments (SE605), Total subsidies on crops (SE610), Total subsidies on livestock (SE615), Total support for rural development (SE624), Subsidies on intermediate consumption (SE625), Decoupled payments (SE630), Support under Art. 68 (SE650), and Other subsides (SE699). The total figures for the 2007-2013 in the two datasets were merged at NUTS 2 level. However, the criterion of perfect matching between NUTS 2 data limited the sample to 81 observations only, of course, as it will be discussed later, this is an important limitation of the analysis that should be taken into account when interpreting the results. The effects of the above expenditure measures have been assessed using the following indicators: Socio-economic situation, 2007-2012 (population density, age structure, economic development, structure of the economy, structure of

the employment, employment rate, unemployment, and long term unemployment); Sectorial economic indicators, 2010 (employment development of primary sector, economic development of primary sector, agricultural land use, farm structure, importance of semi-subsistence farming in new MS, training and education in agriculture, age structure in agriculture, age structure in agriculture, labour productivity in agriculture, gross fixed capital formation in agriculture, labour productivity in food industry, gross fixed capital formation in food industry, employment in food industry, economic development in food industry, forestry structure, forest productivity, labour productivity in forestry, and gross fixed capital formation in forestry); and Diversification and quality of life in rural areas, 2007-2012 (farmers with other gainful activity, employment development of non-agricultural sector, economic development of non-agricultural sector, self-employment development, tourism infrastructure in rural areas, internet infrastructure, internet take-up in rural areas, development of services sector, net migration, educational attainment, life-long learning in rural areas). All the indicators were retrieved from the "Rural Development in the EU – Statistical and Economic Information Report 2013 ".

Table 2.1: Policy expenditure descriptions

Policy for programming period 2007 – 2013	Description
Cohesion Policy from EU 'InfoRegio' portal	
Business support	Financial support entrepreneurs, attract investors and enhance the productive capacity of regions
Energy	Financial support energy policies with particular regard to renewable energy
Environment and natural resources	Financial support to environment related infrastructure
Human resources	Financial support to human capital formation
IT infrastructure and services	Financial support to IT infrastructures
Research and Technology	Financial support to R&D activities
Social infrastructure	Financial support to the development of social infrastructures
Technical assistance	Financial support to help stakeholders implement Commission-funded programmes and projects.
Tourism & Culture	Financial support for the Tourism and Culture sector
Transport infrastructure	Financial support for transportation infrastructures
Urban and rural regeneration	Financial support for urban and rural regeneration policies
Rural Policy from Farm Accountancy Data Network	
Total subsidies (SE605)	Subsidies on current operations linked to production (not investments).
Subsidies on crops (SE610)	All farm subsidies on crops, including compensatory payments and set-aside premiums.

Subsidies on livestock (SE615)	All farm subsidies on livestock and livestock products.
Support for rural development (SE624)	Includes environmental subsidies, LFA subsidies, and other Rural Development payments.
Subsidies on intermediate consumption (SE625)	All farm subsidies on intermediate consumption. Excludes subsidies on wages, rent, taxes and interest.
Decoupled payments (SE630)	Single farm payment and single area payment scheme, including additional aid.
Additional aid (SE640)	Amount resulting from the application of modulation to the first EUR 5000 or less of direct payments.
Support Art.68 (SE650)	Broad ranging specific support. Amongst other things, this includes subsidies to improve quality and marketing of agricultural products, animal welfare standards, and insurance premiums.
Other subsidies (SE699)	Other subsidies received. Including also grants and subsidies for disasters or extraordinary subsidies (agrimonetary compensation, etc.).

2.2 The methodology.

The empirical strategy employed in this report builds on the work of Crescenzi et al. (2015) with some key departures, which are discussed in this section. To explore the role of structural factors - i.e. *place-based* characteristics - in shaping the EU policy both in terms of allocation of funds and effects along with the interaction between cohesion and agricultural policy, the following research questions are tested:

1. To what extent do regions suffering from structural disadvantages attract more cohesion and rural policy funding?
2. Is there a significant synergy (or trade off) between cohesion and rural policies?
3. To what extent do synergies coincide with the most structurally disadvantaged regions?

The corresponding hypotheses are formulated and tested on cross section data in an ordinary least squares regression framework. The principle model framework is as follows:

$$\boldsymbol{CP\_exp_i = \alpha + \mu_i + \beta X\_char_i + \gamma RP\_exp_i + \varepsilon_i} \quad (1)$$

where *i* is each of the NUTS 2 level regions across Europe that have received both Cohesion Policy (CP) and Rural Policy (RP) expenditure. *CP_exp* is the natural log of the regional level EU cohesion

(or regional) policy expenditures, this is presented as the total expenditure and the 12 subcategories of cohesion policy expenditure. Here, per capita measures are not used as population measures are accounted for in the regional characteristics index, anything else is captured by the country level fixed effects. *X_char* is the regional structural characteristics index calculated by Principal Component Analysis (PCA) and Factor Analysis (FA), this is presented as an overall composite index and as 4 subcategory characteristic indices (details about the indices are provided in the Appendix). *RP_exp* is the natural log of the regional level EU rural policy expenditures, this is presented as the total expenditure and as the 9 subcategories of rural policy expenditure $\boldsymbol{\mu_i}$ is country fixed effects, to capture unobserved country specific variations, and *e* is the remaining error.

Testing question (1), β in equation (1) estimates the impact of the regional structural characteristics index (and sub-indices) on the total cohesion policy expenditures and the subcategories. If this coefficient estimate is negative and statistically significant, this shows that cohesion policy funding is flooding to the regions that are most in need of support. To complete the testing of question (1), the impact of the regional structural characteristics index on total rural policy expenditures and the 9 subcategories is estimate in the following way:

$$\boldsymbol{RP\_exp_i = \alpha + \mu + \beta X\_char_i + \gamma CP\_exp_i + \varepsilon_i} \quad (2)$$

Where notation has remained as equation (1) and carries the same intuition.

Testing question (2), γ in equation (1) estimates the impact of total (and subcategory) rural policy expenditures on total (and subcategory) cohesion policy expenditures. A positive and statistically significant coefficient estimate will show synergies between policy areas, suggesting that the policies are targeting the same regions with an additional (or cumulative) impact. If the estimate is

negative, this will show the presence of a trade off between policies, where one policy is compensating for the absence of another. Estimation of γ in equation (2) provides the opportunity for analysis of the regional interplay between cohesion and rural policies, again, the intuition remains similar for estimation equation (1).

Testing question (3), an interaction term between policy expenditures and regional characteristics is added to equation (1) and (2), such that:

$$\boldsymbol{CP\_exp_i} = \boldsymbol{\alpha} + \boldsymbol{\mu} + \boldsymbol{\beta X\_char_i} + \boldsymbol{\gamma RP\_exp_i} + \delta(\boldsymbol{X\_char_i} \,.\, \boldsymbol{RP\_exp_i}) + \boldsymbol{\varepsilon_i} \qquad (3)$$

and

$$\boldsymbol{RP\_exp_i} = \boldsymbol{\alpha} + \boldsymbol{\mu} + \boldsymbol{\beta X\_char_i} + \boldsymbol{\gamma CP\_exp_i} + \delta(\boldsymbol{X\_char_i} \,.\, \boldsymbol{CP\_exp_i}) + \boldsymbol{\varepsilon_i} \qquad (4)$$

Where δ estimates the impact of the interaction between cohesion (rural) policy expenditure and regional characteristics on rural (cohesion) policies. A negative and statistically significant estimate will show that regions suffering from the worst structural characteristics attract the cumulative effect of policy expenditures, in other words, there is presence of 'pro-cohesion' synergies. A positive and significant coefficient estimate (when combined with $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$) will show that stronger regions are better placed to attract policy funds, by other characteristic such as, a capacity to bid for funds.

3. Testing for synergy: empirical results

Analysing the three research questions, this section reports summary statistics for the data, preliminary analysis of correlation between policy expenditures, and reports results from estimating equations (1) to (4). There are 12 subcategories of cohesion policy expenditure and 9

subcategories of rural policy expenditure, the corresponding descriptive statistics are presented in Table 3.1. Cohesion policies provide far larger funding than rural policies, the total policy expenditure is 56,336 million Euros and 12,692 thousand Euros, respectively. Transport Infrastructure is the policy area that has seen the largest amount of funding, 19,543 million Euros in total, an average of 241 million Euros per region. Payments to regions that are decoupled from output size are the largest rural policy area, 8,740 thousand Euros in total.

Table 3.1: Descriptive statistics for policy expenditures

Variable	N	Mean	SD	Min	Max	Sum
Total Cohesion Policy expenditure (millions)	81	695.51	1066.89	16.25	5662.89	56336.22
Business support	81	64.46	99.34	0.31	612.62	5221.27
Energy	81	20.99	30.03	0	155.21	1700.04
Environment and natural resources	81	101.92	137.4	0	798	8255.65
Human resources	81	3.58	8.64	0	46.35	289.89
IT infrastructure and services	81	31.17	52.06	0	285.19	2524.95
Research and Technology	81	128.6	211.35	1.77	1028.71	10416.99
Social infrastructure	81	51.97	148.15	0	1208.82	4209.71
Technical assistance	81	18.58	43.63	0	355.05	1504.79
Tourism & Culture	81	26.06	41.31	0	204.9	2111.20
Transport infrastructure	81	241.28	495.36	0	3030	19543.70
Urban and rural regeneration	81	24.24	43.73	0	251.03	1963.62
Other	81	3.33	25.03	0	220.48	269.72
Total Rural Policy expenditure (thousands)	81	156.7	276.58	6.09	2162.75	12692.34
Subsidies on crops	81	8.18	13.29	0.03	101.36	662.91
Subsidies on livestock	81	11.44	16.74	-1.37	88.93	926.62
Support for rural development	81	19.32	34.08	0	212.89	1565.21
Subsidies on intermediate consumption	81	3.67	14.55	0	107.86	297.07
Decoupled payments	81	107.91	228.41	0	1763.92	8740.64
Additional aid	81	0.29	0.22	0	0.87	23.20
Support Art.68	81	1.68	2.07	0	8.12	135.74
Other subsidies	81	5.22	5.31	0	24.87	423.18

As an initial analysis of the relationship between policy expenditure categories, pairwise correlations is shown in Table 3.2, where * is a significant correlation at $p<0.05$ level. Focussing only on the pairwise correlations between categories of cohesion policy with categories of rural policy, these are shown within the box in Table 3.2. Significant correlations are highlighted by colour: Significant positive correlations are shaded blue, negative correlations in red. Business

Support policy has a positive and significant correlation with three rural policies: Support for rural development, subsidies on intermediate consumption, and decoupled payments. Along with the other correlations shaded blue, these are policy areas that are possibly providing synergy; a cumulative impact of policy expenditure on the affected regions. There appears, however, more instances of negative correlation between policy areas. In particular, between Additional Aid, Support from Article 68, and Other subsidies, with cohesion policies such as, Environment and natural resources, Tourism & Culture, and Transport infrastructure. These policy areas are possibly acting as substitutes, a trade off, where one policy is used in place of funding that is absent. These relationships are formally tested whilst accounting for changes in regional characteristics.

Table 3.2: Pairwise correlations of policy expenditures

	Total Cohesion Policy expenditure	Business support	Energy	Environment and natural resources	Human resources	IT infrastructure and services	Research and Technology	Social infrastructure	Technical assistance	Tourism & Culture	Transport infrastructure	Urban and rural regeneration	Other	Total Rural Policy expenditure	Subsidies on crops	Subsidies on livestock	Support for rural development	Subsidies on intermediate consumption	Decoupled payments	Additional aid	Support Art.68	Other subsidies
Total Cohesion Policy expenditure	1																					
Business support	0.5368*	1																				
Energy	0.4813*	0.3909*	1																			
Environment and natural resources	0.8382*	0.5719*	0.2725*	1																		
Human resources	0.2608*	0.206	0.5436*	0.0645	1																	
IT infrastructure and services	0.8705*	0.3597*	0.6628*	0.6107*	0.4142*	1																
Research and Technology	0.9094*	0.5247*	0.5291*	0.6591*	0.4233*	0.8761*	1															
Social infrastructure	0.6029*	0.4107*	0.1431	0.4991*	0.2868*	0.3927*	0.6411*	1														
Technical assistance	0.7038*	0.3398*	0.4979*	0.4125*	0.2352*	0.7320*	0.6665*	0.3331*	1													
Tourism & Culture	0.7752*	0.5043*	0.7095*	0.6129*	0.6126*	0.7752*	0.7913*	0.5782*	0.6447*	1												
Transport infrastructure	0.9133*	0.4248*	0.3797*	0.7742*	0.0316	0.7923*	0.7476*	0.3005*	0.6887*	0.5617*	1											
Urban and rural regeneration	0.7223*	0.7147*	0.3035*	0.6437*	0.2731*	0.5242*	0.7898*	0.7696*	0.3499*	0.6007*	0.4895*	1										
Other	0.0125	-0.0327	-0.0343	-0.051	-0.0555	0.0409	-0.032	0.0372	-0.0406	-0.0671	0.0036	-0.018	1									
Total Rural Policy expenditure	-0.1465	0.4790*	0.0168	-0.1747	-0.0772	-0.1798	0.0127	-0.1027	-0.0019	-0.1805	-0.0921	0.1601	-0.026	1								
Subsidies on crops	-0.1086	-0.0543	-0.088	-0.1771	-0.1414	-0.0582	-0.0755	-0.0753	-0.1296	-0.2188*	-0.0937	-0.0183	0.7659*	0.2492*	1							
Subsidies on livestock	-0.2275*	-0.1578	-0.2183	-0.2271*	-0.0934	-0.2224*	-0.1884	-0.0952	-0.1755	-0.2395*	-0.1986	-0.1566	0.0135	0.2286*	0.149	1						
Support for rural development	-0.1749	0.3226*	-0.0537	-0.1913	-0.0549	-0.1868	-0.0482	-0.0757	-0.0282	-0.1544	-0.1359	0.0759	-0.0577	0.7313*	0.0395	0.4779*	1					
Subsidies on intermediate consumption	-0.0364	0.5767*	0.083	-0.0539	-0.0206	-0.1055	0.0903	-0.0414	0.0805	-0.0808	0.0074	0.2241*	-0.0336	0.9309*	0.0876	0.0013	0.6255*	1				
Decoupled payments	-0.1199	0.5007*	0.0457	-0.146	-0.0634	-0.1571	0.0388	-0.0944	0.016	-0.1535	-0.0681	0.1799	-0.0636	0.9890*	0.2184	0.1154	0.6386*	0.9451*	1			
Additional aid	-0.3233*	-0.0684	-0.1824	-0.3534*	-0.0235	-0.218	-0.1308	-0.2452*	-0.2688*	-0.3244*	-0.2840*	-0.0913	-0.1634	0.5701*	0.2301*	0.4556*	0.4388*	0.3295*	0.5451*	1		
Support Art.68	-0.2522*	-0.2592*	-0.1687	-0.2902*	-0.0653	-0.1977	-0.1972	-0.128	-0.1885	-0.2615*	-0.2320*	-0.1635	-0.0916	0.105	0.2907*	0.5917*	0.1876	-0.1602	0.0441	0.4976*	1	
Other subsidies	-0.2233*	0.0828	-0.0846	-0.2226*	-0.2096	-0.1943	-0.1998	-0.158	0.0215	-0.2117	-0.1451	-0.0746	-0.0932	0.4064*	0.0921	0.3479*	0.5232*	0.2590*	0.3403*	0.3023*	0.3342*	1

Variables that help to describe a region's characteristics are listed in Table 3.3 along with summary statistics. There are 4 categories of variables relating to: The importance of rural areas (ra); Socio-economic indicators (se); Sectorial economic indicators (sect); and Diversification and quality of life (div).

Table 3.3: Descriptive statistics of regional characteristics variables used to make the composite index

Variable	Description	N	Mean	SD	Min	Max
ra1	% territory in predominantly rural regions	81	46.01	33.31	0	100
ra2	% territory in intermediate regions	81	38.65	29.75	0	100
ra3	% territory in predominantly urban regions	81	15.35	27.39	0	100
ra4	% population in predominantly rural regions	81	35.1	32.3	0	100
ra5	% population in intermediate regions	81	40.73	31.95	0	100
ra6	% population in predominantly urban regions	81	24.16	34.29	0	100
ra10	% employment in predominantly rural regions	81	33.69	32	0	100.03
ra11	% employment in intermediate regions	81	41.13	32.54	0	100.02
ra12	% employment in predominantly urban regions	81	25.18	35.14	0	100
se1	Population density hab/km2	81	202.12	339.86	23.4	2373.9
se2	Change in population density hab/km2	81	2.61	7.53	-9.5	40.1
se3	% people aged 0-14	81	15.31	2.31	10.89	20.21
se4	% people aged 15-64	81	66.23	2.57	61.45	72.66
se5	% people aged 65 and more	81	18.46	3.09	12.45	26.99
se6	Old-age dependency ratio (pop 65+ y.o. / pop 15-64 y.o.) per 100	81	28.04	5.46	17.42	43.93
se7	Young/old population ratio (pop 0-14 y.o . / pop 65+ y.o.) per 100	81	86.51	24.32	42.79	151.03
se16	% employment in primary sector	81	8.25	9.45	0.17	51.39
se17	% employment in secondary sector	81	24.38	5.68	13	40.48
se18	% employment in tertiary sector	81	67.36	12.58	28.95	86.74
se22	Employment rate (% total population)	81	60.11	7.61	40	76.1
se23	Change in employment rate	81	-2.29	4.66	-13.1	7.5
se24	Unemployment rate (% active population)	81	12.95	7.07	3.4	34.6
se25	Change in unemployment rate	81	5.14	6.5	-6.6	22.6
se26	Long-term unemployment rate (% active population)	81	5.91	3.5	1.1	15.27
se28	Long-term unemployment (% total unemployment)	81	44.77	9.29	17.67	67.07
sect1	Employment development of primary sector (Branch A) 1000 persons	81	75.85	123.68	2.3	862.5
sect2	Share of employment in primary sector (Branch A) % of total employment	81	8.25	9.45	0.17	51.39
sect27	Share of employment in food industry (% total employment in manufacturing)	81	20.11	10.15	6.55	70.32
sect28	Share of employment in food industry (% total employment)	81	2.84	1.21	0.55	7.29
sect29	Average annual growth rate of employment in food industry	81	-1.15	4.69	-12.03	15.86
div1	% Famers (holders) with other gainful activity	81	36.77	16.86	13.22	83.72
div2	Employment in secondary and tertiary sectors 1000 people employed	81	964.41	956.56	58.3	5962.5
div3	Share of secondary and tertiary sectors % of total employment	81	91.75	9.45	48.61	99.83
div8	Self-employed persons 1000 people employed	81	158.05	155.63	12.2	910.8
div9	Share of self-employment in total employment % of total employment	81	15.72	5.94	6.26	28.79
div10	Change in the number of self-employed, in % points	81	-2.56	15.35	-39.88	75.8
div15	Net migration (Total pop change-Natural pop change/Average annual pop) per 1000	81	1.29	3.9	-4.9	21.6
div16	Change in the net migration crude rate per 1000	81	-3.7	7	-24.9	9.1
div17	% adults (25-64) with medium or high educational attainment	81	66.77	15.2	24.49	93.99
div18	Change in %adults with medium or high educational attainment	81	4.55	2.92	-0.85	13.78

	diff in %points					
div19	% of 25-64 y.o. participating in education and training	81	6.66	3.71	0.66	22.93
div20	Change in % of 25-64 y.o. participating in education and training	81	0.32	1.55	-2.33	6.92

The variables in each category contribute to constructing a composite index, 1 for each category and an overall composite index (as mentioned details about the procedure to compute the index are reported in the appendix). This index provides a composite measure of the structural performance of the region. The larger the index score, the better performing the region is. These indices are shown by region in Table 3.4, ordered by overall composite index.

Table 3.4: Regional characteristics composite index by region

Country	Region	NUTS code	Overall Composite	RA Index	SE Index	SECT Index	DIV Index
(ITA) Italy	Lombardia	ITC4	0.4969	0.4761	0.4671	0.2726	0.5090
(DEU) Germany	Hamburg	DE60	0.4968	0.4478	0.5848	0.2518	0.3955
(ROU) Romania	Nord-Est	RO21	0.4934	0.4995	0.4839	0.6593	0.3158
(FRA) France	Île de France	FR10	0.4933	0.4723	0.5295	0.2445	0.4387
(POL) Poland	Mazowieckie	PL12	0.4852	0.4805	0.5087	0.4059	0.4219
(SUO) Finland	Länsi-Suomi	FI19	0.4849	0.4671	0.5231	0.3019	0.4300
(LUX) Luxembourg	Luxembourg	LU00	0.4848	0.5596	0.5333	0.2297	0.4508
(ROU) Romania	Bucuresti - Ilfov	RO32	0.4775	0.4478	0.5718	0.2713	0.3230
(FRA) France	Rhône-Alpes	FR71	0.4775	0.4831	0.5148	0.2953	0.4041
(POL) Poland	Wielkopolskie	PL41	0.4733	0.4310	0.5003	0.4471	0.3618
(MLT) Malta	Malta	MT00	0.4726	0.4478	0.5316	0.2905	0.3245
(ROU) Romania	Nord-Vest	RO11	0.4721	0.4880	0.4907	0.4684	0.3136
(DEU) Germany	Rheinhessen-Pfalz	DEB3	0.4699	0.4930	0.5180	0.2712	0.3733
(DEU) Germany	Saarland	DEC0	0.4668	0.4764	0.4877	0.2933	0.3499
(FRA) France	Pays de la Loire	FR51	0.4654	0.4610	0.5143	0.3758	0.3617
(DEU) Germany	Schleswig-Holstein	DEF0	0.4638	0.5234	0.5014	0.3033	0.3836
(BEL) Belgium	Prov. West-Vlaanderen	BE25	0.4633	0.4592	0.5263	0.2963	0.3555
(POR) Portugal	Norte	PT11	0.4631	0.4624	0.4121	0.3401	0.3761
(FRA) France	Corse	FR83	0.4617	0.4259	0.4637	0.4306	0.3605
(ITA) Italy	Piemonte	ITC1	0.4608	0.4554	0.4431	0.3020	0.4100
(FRA) France	Provence-Alpes-Côte d'Azur	FR82	0.4602	0.4756	0.4815	0.2801	0.3767
(ROU) Romania	Sud - Muntenia	RO31	0.4599	0.4805	0.4517	0.5391	0.3065
(DEU) Germany	Niederbayern	DE22	0.4590	0.4260	0.5120	0.2953	0.3702
(FRA) France	Bretagne	FR52	0.4588	0.4657	0.5121	0.4281	0.3663
(ITA) Italy	Valle d'Aosta/Vallée d'Aoste	ITC2	0.4581	0.5596	0.4816	0.3112	0.3493
(FRA) France	Midi-Pyrénées	FR62	0.4571	0.4312	0.4957	0.3293	0.3730
(FRA) France	Basse-Normandie	FR25	0.4549	0.4813	0.4953	0.3885	0.3303
(FRA) France	Poitou-Charentes	FR53	0.4546	0.4260	0.5016	0.3413	0.3543
(FRA) France	Limousin	FR63	0.4530	0.4260	0.5002	0.3111	0.3625
(FRA) France	Aquitaine	FR61	0.4510	0.4590	0.4907	0.3129	0.3724
(ITA) Italy	Liguria	ITC3	0.4504	0.4882	0.4812	0.2370	0.3830
(ESP) Spain	Comunidad de Madrid	ES30	0.4492	0.4478	0.4480	0.2409	0.4157
(UKI) United Kingdom	Northern Ireland (UK)	UKN0	0.4487	0.4866	0.4781	0.3408	0.3437
(FRA) France	Centre (FR)	FR24	0.4483	0.4846	0.4824	0.3077	0.3488
(FRA) France	Nord - Pas-de-Calais	FR30	0.4474	0.4929	0.4729	0.3201	0.3285

(POR) Portugal	Alentejo	PT18	0.4466	0.4260	0.4333	0.3918	0.3322
(FRA) France	Haute-Normandie	FR23	0.4461	0.5101	0.4782	0.3250	0.3210
(FRA) France	Auvergne	FR72	0.4459	0.4818	0.4821	0.3121	0.3559
(FRA) France	Bourgogne	FR26	0.4457	0.4682	0.4730	0.3222	0.3427
(DEU) Germany	Sachsen-Anhalt	DEE0	0.4454	0.5152	0.4580	0.2996	0.3501
(ROU) Romania	Vest	RO42	0.4453	0.5020	0.4751	0.3676	0.3024
(ROU) Romania	Sud-Est	RO22	0.4448	0.5006	0.4360	0.4699	0.3093
(FRA) France	Alsace	FR42	0.4441	0.5596	0.4969	0.2658	0.3439
(BGR) Bulgaria	Yugozapaden	BG41	0.4421	0.4536	0.4319	0.3408	0.3573
(BGR) Bulgaria	Yugoiztochen	BG34	0.4420	0.5596	0.4405	0.4390	0.2929
(DEU) Germany	Mecklenburg-Vorpommern	DE80	0.4410	0.5014	0.4618	0.3172	0.3498
(ITA) Italy	Abruzzo	ITF1	0.4406	0.4510	0.4338	0.3206	0.3764
(FRA) France	Franche-Comté	FR43	0.4406	0.4934	0.4903	0.2554	0.3311
(ROU) Romania	Centru	RO12	0.4352	0.4777	0.4546	0.3961	0.3062
(ESP) Spain	Comunidad Foral de Navarra	ES22	0.4307	0.5596	0.4336	0.3968	0.3476
(ITA) Italy	Puglia	ITF4	0.4303	0.5292	0.4119	0.3408	0.3550
(ESP) Spain	La Rioja	ES23	0.4288	0.5596	0.4058	0.4525	0.3226
(BGR) Bulgaria	Yuzhen tsentralen	BG42	0.4283	0.5045	0.3988	0.4689	0.2905
(FRA) France	Lorraine	FR41	0.4279	0.5136	0.4635	0.3046	0.3189
(ITA) Italy	Campania	ITF3	0.4275	0.4857	0.3724	0.3355	0.3912
(ITA) Italy	Sicilia	ITG1	0.4258	0.5039	0.3804	0.3508	0.3654
(ESP) Spain	Castilla y León	ES41	0.4256	0.5206	0.4040	0.3868	0.3572
(FRA) France	Languedoc-Roussillon	FR81	0.4242	0.5254	0.4449	0.2938	0.3564
(ITA) Italy	Molise	ITF2	0.4236	0.4260	0.4244	0.3537	0.3333
(POR) Portugal	Região Autónoma dos Açores (PT)	PT20	0.4220	0.4260	0.4158	0.4662	0.3113
(FRA) France	Picardie	FR22	0.4218	0.4759	0.4692	0.2973	0.3023
(BGR) Bulgaria	Severen tsentralen	BG32	0.4199	0.4778	0.3968	0.4469	0.2747
(ESP) Spain	Galicia	ES11	0.4188	0.5106	0.3929	0.3740	0.3591
(FRA) France	Champagne-Ardenne	FR21	0.4187	0.4788	0.4623	0.3339	0.2945
(ESP) Spain	Cantabria	ES13	0.4170	0.5596	0.4037	0.3171	0.3455
(ESP) Spain	Cataluña	ES51	0.4168	0.4708	0.3753	0.3109	0.3867
(ESP) Spain	Aragón	ES24	0.4147	0.4364	0.4023	0.3068	0.3451
(ESP) Spain	Comunidad Valenciana	ES52	0.4119	0.4671	0.3615	0.3111	0.3820
(ESP) Spain	Andalucía	ES61	0.4106	0.5041	0.3361	0.3871	0.3921
(BGR) Bulgaria	Severozapaden	BG31	0.4097	0.4260	0.3932	0.4365	0.2675
(ESP) Spain	Principado de Asturias	ES12	0.4085	0.5596	0.3897	0.2932	0.3504
(ESP) Spain	Región de Murcia	ES62	0.4085	0.4478	0.3722	0.4317	0.3153
(BGR) Bulgaria	Severoiztochen	BG33	0.4068	0.5128	0.3827	0.4126	0.2828
(ITA) Italy	Sardegna	ITG2	0.4064	0.4662	0.3929	0.3125	0.3503
(ESP) Spain	Illes Balears	ES53	0.4061	0.5596	0.4047	0.2862	0.3624
(HUN) Hungary	Észak-Magyarország	HU31	0.4056	0.5007	0.4272	0.3053	0.2850
(ITA) Italy	Basilicata	ITF5	0.4042	0.4260	0.4062	0.3137	0.3282
(ITA) Italy	Calabria	ITF6	0.4003	0.4602	0.3687	0.3495	0.3400
(ESP) Spain	Castilla-la Mancha	ES42	0.3892	0.5029	0.3499	0.3904	0.3278
(ESP) Spain	Extremadura	ES43	0.3817	0.5045	0.3428	0.4193	0.3098
(ESP) Spain	Canarias (ES)	ES70	0.3795	0.4735	0.3326	0.3062	0.3405

Results from estimating equations (1) to (4) are shown in Table 3.8 to 3.13. Robust standard errors are shown in parentheses. Statistical significance is reported as *** p<0.01, ** p<0.05, * p<0.1. Country specific fixed effects are reported, with respect to Belgium and the base county, in all estimations. It is worth adding a cautionary note on interpretation: The number of observations is

low (81) and there are a number of covariates which may produce overfitting of the specified model or problems of multicollinearity; beyond this, as panel data is note used, a causal interpretation is diluted due to possible endogeneity concerns.

1. **To what extent do regions suffering from structural disadvantages attract more cohesion and rural policy funding?**

Table 3.8 shows the estimation of equation (1) using data of total rural policy expenditures and the overall regional characteristics index. The overall regional index has a significant negative impact on total cohesion policy. For a 0.01 decrease in the index, cohesion policy expenditure reduces by 14.57%. Showing that, in total, cohesion policy flows to areas most in need of support. This result is reflected when disaggregating the cohesion policies, all coefficient estimates are negative, 5 of the 12 are significant. In particular, Social infrastructure expenditure is most sensitive to flooding towards regions of structural disadvantage. Table 3.9 shows results from estimation equation (1) with disaggregated rural policies and regional characteristics indices data. Of the disaggregated regional indices, the Socio-economic indicators index has a negative and significant impact on all cohesion policy measures (except for energy and tourism and culture policies, which are not significant). This result shows that regions structurally disadvantaged, as measured by Socio-economic indicators, are attracting more cohesion policy funding. In contrast, regions stronger by Diversification and quality of life measures attract more cohesion funding. Interestingly, transport infrastructure expenditure is particularly sensitive to diversification of regions. These results show a complex relationship between structurally disadvantaged regions and the cohesion policy funding they attract. On balance, weaker regions (measure by se) better

attract Total Cohesion policy funding compared to stronger regions (measured by div), a magnitude of 26.23% and 11.82% respectively for each 0.01 change in index score.

Results from estimating equation (2) using data of total cohesion policy expenditures and the overall regional characteristics index is shown in Table 3.10. Here, the overall regional index has no impact on the total or any subcategory of rural policy. The disaggregated estimation, shown in Table 3.11, shows a similarly complex pattern of results compared to estimation of cohesion policy. Regions that are weaker by Sectorial economic indicators are attracting more rural policy funds. This particularly applies to Subsidies on crops, Subsidies on intermediate consumption, Decoupled payments, and Other subsidies. Furthermore, Support for rural development funds are particularly sensitive to regional Socio-economic indicators, again this policy flows towards regions most in need. However, policies that provide Subsidies on intermediate consumption are attracted by regions stronger by the Importance of rural area measures. Similarly, Support provided by Article 68 funds are attracted by regions stronger by Diversification and quality of life measures.

2. Is there a significant synergy (or trade off) between cohesion and rural policies?

There appears to be no significant relationship between Total Cohesion policy and Total Rural policy, in Table 3.8. When cohesion policy is disaggregated, Total Rural policy has a positive and significant impact on IT infrastructure and services policy. A 1% increase in total rural expenditure leads to a 1.5% increase in IT infrastructure and services expenditure. Disaggregating Rural policy, Table 3.9, shows nuances of synergy and trade-off between subcategories of cohesion and rural policy. These relationships are summarised in Table 3.5.

Table 3.5: Synergies and trade offs - rural policy impact on cohesion policy

Rural policy	Cohesion policy
Synergies between:	
Subsidies on crops	Energy; Other
Subsidies on livestock	Other
Other subsidies	Other
Trade offs between:	
Subsidies on livestock	Energy; Human resources
Support for rural development	Technical assistance; Other
Subsidies on intermediate consumption	Social infrastructure
Decoupled payments	Other
Support Art.68	Environment and natural resources; IT infrastructure and services; Research and Technology
Other subsidies	Total cohesion policy; Energy

Results from estimating equation (2), Table 3.10, show there is no significant relationship between Total Cohesion and rural policies, except for a negative impact on Other subsidies. Disaggregation of cohesion policy, Table 3.11, again shows a more complex relationship. The synergies and trade-offs from cohesion policy impacts on rural policy are summarised in Table 3.6.

Table 3.6: Synergies and trade-offs - cohesion policy impact on rural policy

Cohesion policy	Rural policy
Synergies between:	
Business Support	Subsidies on crops
Environment and natural resources	Decoupled payments; Additional aid; Other subsidies
IT infrastructure and services	Support for rural development
Research and Technology	Subsidies on crops
Other	Subsidies on crops
Trade offs between:	
Human resources	Subsidies on livestock; Other subsidies
Research and Technology	Support for rural development
Transport infrastructure	Subsidies on livestock; Support for rural development; Other subsidies
Other	Support for rural development; Decoupled payments; Additional aid; Support Art.68

Tables 3.5 and 3.6 show in total 32 significant relationships from the estimation results of equation (1) and (2). Of these 32 relationships, 4 are robust across the estimations, they are significant when estimating the impact of rural policy on cohesion policy and the reverse causality, these are shown in Table 3.7.

Table 3.7: Synergies and trade-offs – robust relationships between cohesion and rural policy

	Cohesion policy	Rural policy
Synergies between:		
	Other	Subsidies on crops
Trade offs between:		
	Human resources	Subsidies on livestock
	Other	Support for rural development
	Other	Decoupled payments

3. To what extent do synergies coincide with the most structural disadvantaged regions?

Results from estimating equation (3) and (4) are shown in Table 3.12 and 3.13. Including an interaction term between the regional characteristics index and policy expenditure allows an interpretation of policy fund synergies (or trade off) coinciding with weaker (or stronger) regions. Estimates from equation (3) show that structurally disadvantaged regions do attract expenditure synergies between Total Rural policy expenditure and Total Cohesion policy. In more detail, these 'pro-cohesion policies' are Environment and natural resources, Human resources, Tourism and Culture, Transport infrastructure polices. Similarly, from equation (4), results show that Total Cohesion policy combined with Subsidies on intermediate consumption, Decoupled payments, Additional aid, Support Art.68, and Other rural subsidies provide synergy and are attracted by weaker regions. Combined, these results provide evidence to support the presence of 'pro-cohesion' policies that provide a cumulative impact and are focussed on structurally disadvantaged regions.

Table 3.8: Results from OLS estimation of Equation (1): Cohesion policy categories = f(Overall regional characteristic index, Total Rural policy expenditure).

VARIABLES	(1) Total cohesion policy	(2) Business support	(3) Energy	(4) Environment and natural resources	(5) Human resources	(6) IT infrastructure and services	(7) Research and Technology	(8) Social infrastructure	(9) Technical assistance	(10) Tourism and Culture	(11) Transport infrastructure	(12) Urban and rural regeneration	(13) Other
Total rural policy expenditure	-0.00173	0.169	-0.285	1.274	-1.039	1.516**	0.0916	0.638	0.317	-1.151	0.498	-1.015	0.103
	(0.230)	(0.382)	(0.643)	(0.911)	(1.427)	(0.696)	(0.243)	(1.086)	(0.380)	(0.921)	(1.306)	(0.784)	(0.307)
Overall regional index	-14.57**	-25.53***	-38.96	-23.28**	-64.17*	-13.44	-0.0818	-122.9***	-5.113	2.841	-89.63**	-50.76	-37.47
	(6.162)	(8.414)	(26.15)	(11.34)	(35.44)	(14.96)	(7.109)	(46.19)	(9.301)	(29.73)	(43.59)	(40.24)	(26.24)
country==(BGR) Bulgaria	2.130***	1.669**	0.745	5.330***	11.67***	1.219	0.199	13.36***	3.417***	15.66***	1.955	-1.354	-1.320
	(0.509)	(0.726)	(1.435)	(1.147)	(2.233)	(1.449)	(0.499)	(2.655)	(0.726)	(1.472)	(2.930)	(2.211)	(1.001)
country==(DEU) Germany	1.528***	1.547**	-0.263	-0.228	9.641***	-3.676	1.029**	12.35***	-0.475	14.05***	-1.680	1.348	-0.0553
	(0.430)	(0.728)	(2.467)	(2.009)	(3.500)	(2.245)	(0.489)	(1.559)	(2.363)	(2.045)	(2.869)	(1.028)	(0.407)
country==(ESP) Spain	2.095***	0.300	-6.223**	4.485***	-4.041*	4.162***	1.861***	2.135	0.876	11.56***	-3.222	-2.049	-0.632
	(0.600)	(0.786)	(2.814)	(0.881)	(2.144)	(1.021)	(0.567)	(3.366)	(0.828)	(2.775)	(4.127)	(2.463)	(0.875)
country==(FRA) France	1.198***	0.458	1.919***	1.601***	9.228***	1.489***	0.775***	5.080**	1.114***	13.53***	0.474	-1.586	-0.552
	(0.195)	(0.308)	(0.476)	(0.589)	(1.875)	(0.500)	(0.186)	(2.049)	(0.230)	(1.211)	(0.838)	(1.312)	(0.449)
country==(HUN) Hungary	3.008***	2.566***	1.291	4.544***	-3.803*	2.144**	1.316***	12.50***	4.055***	18.04***	0.158	0.616	-2.153
	(0.362)	(0.496)	(1.525)	(0.631)	(2.053)	(0.863)	(0.421)	(2.701)	(0.549)	(1.704)	(2.571)	(2.362)	(1.506)
country==(ITA) Italy	1.826***	1.335	1.636	4.057***	4.976*	2.169	1.380*	6.110**	2.508***	15.47***	-3.646	-5.170	-0.921
	(0.604)	(0.919)	(1.306)	(1.211)	(2.715)	(1.864)	(0.716)	(2.905)	(0.856)	(1.328)	(3.969)	(3.108)	(0.845)
country==(LUX) Luxembourg	-0.310	-1.666***	2.577***	-0.236	2.287	-3.542***	-0.778**	2.080	-0.686	0.947	-12.32***	-13.06***	0.715
	(0.268)	(0.417)	(0.887)	(0.754)	(1.477)	(0.676)	(0.310)	(1.581)	(0.438)	(0.948)	(1.759)	(1.353)	(0.549)
country==(MLT) Malta	3.282***	2.158***	3.797***	7.259***	-0.790	5.196***	1.359***	20.43***	2.858***	16.85***	6.544***	-0.288	0.484
	(0.297)	(0.497)	(0.832)	(1.254)	(1.924)	(0.945)	(0.303)	(1.371)	(0.487)	(1.300)	(1.612)	(0.911)	(0.534)
country==(POL) Poland	5.034***	4.180***	4.494***	7.870***	-0.249	7.506***	3.631***	21.64***	5.484***	17.02***	9.513***	2.367***	0.723
	(0.487)	(0.516)	(0.797)	(1.301)	(1.829)	(1.120)	(0.501)	(1.582)	(0.902)	(1.292)	(1.724)	(0.836)	(0.668)
country==(POR) Portugal	3.745***	2.942***	-4.300	6.351***	7.341	4.670***	2.646***	18.05***	3.608***	16.69***	4.412**	-4.285	5.268
	(0.601)	(0.669)	(5.160)	(0.981)	(4.828)	(1.327)	(0.930)	(2.384)	(0.688)	(0.946)	(2.055)	(6.179)	(4.886)
country==(ROU) Romania	2.826***	2.947***	1.473	7.816***	-0.483	5.073***	0.147	18.39***	2.883***	14.41***	6.207**	-17.30***	0.138
	(0.524)	(0.854)	(1.416)	(1.958)	(3.521)	(1.564)	(0.778)	(2.537)	(0.914)	(1.980)	(2.876)	(1.747)	(0.705)
country==(SUO) Finland	1.595***	1.892***	1.966**	0.969	18.31***	-0.0860	0.937***	17.30***	1.329***	16.82***	3.166*	-1.670	0.714
	(0.282)	(0.440)	(0.923)	(0.810)	(1.559)	(0.717)	(0.325)	(1.643)	(0.461)	(0.995)	(1.838)	(1.401)	(0.556)
country==(UKI) United Kingdom	1.572***	-0.0534	1.513***	-3.210***	10.61***	1.919***	1.851***	-2.058***	0.422**	17.37***	1.202*	-6.285***	-0.590
	(0.112)	(0.175)	(0.408)	(0.457)	(0.774)	(0.368)	(0.110)	(0.678)	(0.172)	(0.619)	(0.635)	(0.504)	(0.437)
Constant	24.00***	25.22***	35.36**	9.444	41.96*	1.969	15.63***	49.41*	12.42*	12.24	49.47	50.51**	16.15
	(4.422)	(6.628)	(15.78)	(10.30)	(23.76)	(10.50)	(5.195)	(28.27)	(7.120)	(16.17)	(30.14)	(24.71)	(11.63)
Observations	81	81	81	81	81	81	81	81	81	81	81	81	81
R-squared	0.489	0.411	0.325	0.576	0.468	0.342	0.351	0.435	0.276	0.358	0.298	0.581	0.226

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.9: Results from OLS estimation of Equation (1): Cohesion policy categories = f(Regional indices, Rural policy categories).

VARIABLES	(1) Total cohesion policy	(2) Business support	(3) Energy	(4) Environment and natural resources	(5) Human resources	(6) IT infrastructure and services	(7) Research and Technology	(8) Social infrastructure	(9) Technical assistance	(10) Tourism and Culture	(11) Transport infrastructure	(12) Urban and rural regeneration	(13) Other
Subsidies on crops	0.0473	0.178	1.328**	-0.117	-0.619	0.194	0.169	0.302	0.0963	-0.563	0.264	0.0684	0.363**
	(0.119)	(0.166)	(0.514)	(0.153)	(0.496)	(0.356)	(0.122)	(0.818)	(0.136)	(0.743)	(0.770)	(0.370)	(0.162)
Subsidies on livestock	0.0284	0.0362	-0.731*	0.175	-0.906**	0.0846	-0.0281	-0.649	0.0256	-0.403	-0.216	-0.567	0.289**
	(0.0791)	(0.126)	(0.417)	(0.158)	(0.414)	(0.320)	(0.0852)	(0.550)	(0.174)	(0.463)	(0.453)	(0.390)	(0.117)
Support for rural development	-0.163	-0.0452	0.798	-0.218	-0.264	-0.0376	-0.214	0.742	-0.446**	0.479	-0.533	-0.362	-0.397**
	(0.111)	(0.135)	(0.605)	(0.191)	(0.632)	(0.452)	(0.131)	(0.922)	(0.200)	(0.526)	(0.596)	(0.368)	(0.194)
Subsidies on intermediate consumption	-0.0586	0.00721	-0.760	0.0570	0.00674	0.0337	0.00653	-1.303**	-0.152	-0.189	-0.510	-0.115	0.188
	(0.0776)	(0.102)	(0.503)	(0.141)	(0.473)	(0.231)	(0.0731)	(0.585)	(0.0930)	(0.437)	(0.539)	(0.327)	(0.112)
Decoupled payments	-0.00162	0.128	0.718	0.115	-1.662	-0.0436	0.162	-1.199	0.371	0.468	0.180	0.791	-1.881***
	(0.119)	(0.214)	(0.807)	(0.290)	(1.138)	(0.401)	(0.119)	(1.059)	(0.419)	(1.008)	(0.713)	(0.532)	(0.458)
Additional aid	0.339	0.0326	0.207	0.858	2.982	1.217	0.254	2.966	-0.282	0.473	1.117	0.146	0.305
	(0.217)	(0.407)	(1.014)	(0.589)	(2.372)	(0.895)	(0.238)	(2.060)	(0.841)	(1.503)	(1.469)	(1.108)	(0.528)
Support Art.68	-0.119	-0.102	-0.0620	-0.673**	0.814	-1.016***	-0.216*	0.585	-0.135	-0.293	-1.128	0.370	-0.0280
	(0.103)	(0.179)	(0.573)	(0.335)	(0.721)	(0.374)	(0.121)	(1.039)	(0.185)	(0.609)	(0.679)	(0.766)	(0.227)
other subsidies	-0.0965*	-0.0570	-0.732*	0.381	-0.514	0.176	-0.0800	-0.183	0.0221	-0.616	-0.0584	-0.457	0.447**
	(0.0522)	(0.118)	(0.370)	(0.282)	(0.531)	(0.288)	(0.0579)	(0.655)	(0.151)	(0.499)	(0.405)	(0.297)	(0.196)
RA Index	1.291	-1.325	37.30*	-2.832	31.71	18.06	2.380	37.07	9.160	-11.63	10.05	20.81	-2.026
	(4.227)	(4.916)	(19.74)	(6.178)	(20.51)	(14.69)	(4.240)	(26.68)	(10.81)	(15.96)	(25.18)	(17.05)	(4.846)
SE Index	-26.23***	-31.62***	-21.46	-47.84***	-73.57**	-50.39***	-17.76***	-100.8***	-28.94***	-21.24	-124.8***	-56.88***	-25.15**
	(4.948)	(6.904)	(21.86)	(14.15)	(30.29)	(15.86)	(5.429)	(33.02)	(7.066)	(27.87)	(29.42)	(16.46)	(11.09)
SECT Index	-0.608	-1.544	-1.540	0.309	-15.34	-5.947	-0.105	-13.46	-2.182	-16.84	-10.75	-17.42	0.115
	(2.126)	(2.631)	(10.05)	(3.098)	(13.06)	(5.597)	(2.032)	(15.33)	(2.524)	(12.24)	(12.47)	(12.12)	(3.516)
DIV Index	11.82***	11.22*	2.388	17.15**	6.086	29.98*	14.06***	-1.258	15.42**	28.39	52.43**	-2.732	-1.273
	(4.218)	(6.212)	(14.82)	(7.037)	(27.16)	(16.89)	(4.532)	(36.17)	(6.588)	(21.23)	(21.81)	(35.39)	(7.345)
country==(BGR) Bulgaria	2.789**	0.301	8.524	4.614*	19.41	3.056	0.566	29.74**	0.776	22.63**	4.485	-1.720	-5.004**
	(1.318)	(2.124)	(6.698)	(2.523)	(13.64)	(4.715)	(1.698)	(11.91)	(4.772)	(8.487)	(7.903)	(6.047)	(2.466)
country==(DEU) Germany	0.574	0.157	0.849	-4.001	7.890	-10.58**	-1.132	23.70**	-0.593	8.913	-7.892	-1.052	1.286
	(0.952)	(1.355)	(7.277)	(3.110)	(7.471)	(4.411)	(0.944)	(9.550)	(2.486)	(6.003)	(7.309)	(5.154)	(2.554)
country==(ESP) Spain	-0.751	-2.891**	-5.372	-0.959	-13.64**	-3.165	-0.965	-1.008	-2.785**	12.02***	-13.88***	-6.900**	-5.055***
	(0.842)	(1.164)	(3.770)	(2.029)	(5.578)	(3.019)	(1.003)	(5.833)	(1.292)	(4.311)	(4.911)	(3.409)	(1.738)
country==(FRA) France	0.909*	-0.463	3.467	1.298	6.801*	1.255	0.140	9.261**	1.100	15.77***	1.858	-3.554	-2.336**
	(0.525)	(0.806)	(3.324)	(1.089)	(3.447)	(1.464)	(0.574)	(4.108)	(0.672)	(3.230)	(3.302)	(2.747)	(0.899)
country==(HUN)	4.886***	2.064	6.697	7.757**	8.176	7.054	2.286	34.65***	2.374	23.25**	8.634	-1.262	-2.550

Hungary													
	(1.350)	(2.339)	(7.019)	(3.025)	(14.12)	(4.913)	(1.628)	(12.57)	(5.165)	(9.102)	(8.524)	(7.080)	(2.672)
country==(ITA) Italy	-0.668	-1.304	-2.065	-0.324	-5.463	-4.103	-0.852	-4.098	-0.916	12.24***	-16.29***	-10.69***	-2.566**
	(0.609)	(1.055)	(2.868)	(1.178)	(3.499)	(3.247)	(0.738)	(4.658)	(1.193)	(2.735)	(4.393)	(3.615)	(1.171)
country==(LUX) Luxembourg	-0.999	-2.452	0.933	-4.487	-8.263	-12.81**	-2.698**	5.282	-0.821	-8.998	-22.11***	-18.20**	3.887
	(1.093)	(1.630)	(8.750)	(2.937)	(8.336)	(5.019)	(1.250)	(12.68)	(2.173)	(7.004)	(7.961)	(7.073)	(2.814)
country==(MLT) Malta	4.749***	1.792	4.378	7.792***	19.34*	5.142	1.980	37.00***	1.292	20.92**	6.727	4.939	-2.306
	(1.234)	(2.169)	(6.018)	(2.878)	(11.48)	(5.165)	(1.231)	(11.05)	(3.631)	(8.174)	(8.585)	(6.237)	(2.460)
country==(POL) Poland	6.481***	3.448	9.952	8.984***	9.563	10.77**	4.199**	40.83***	4.076	21.22**	12.64	3.878	-1.225
	(1.319)	(2.530)	(8.044)	(3.315)	(13.47)	(5.285)	(1.633)	(12.92)	(4.564)	(8.033)	(8.994)	(7.537)	(3.034)
country==(POR) Portugal	2.389***	0.652	-0.241	4.306**	2.774	2.798	2.063**	18.02***	2.799***	20.25***	0.364	-2.913	-4.578**
	(0.768)	(1.102)	(4.944)	(1.725)	(7.553)	(2.358)	(0.903)	(5.344)	(0.979)	(4.418)	(4.309)	(3.832)	(2.077)
country==(ROU) Romania	3.966***	2.589	12.97*	6.685**	11.06	6.737	0.741	39.81***	0.315	24.19***	9.706	-13.56**	-5.266**
	(1.348)	(2.109)	(6.865)	(2.732)	(12.79)	(5.605)	(1.475)	(11.26)	(4.565)	(8.063)	(8.658)	(6.663)	(2.324)
country==(SUO) Finland	0.892**	0.622	-1.897	1.836***	16.09***	0.167	0.771	11.39***	1.582**	15.63***	1.242	-2.256	-0.973
	(0.443)	(0.696)	(1.658)	(0.683)	(2.589)	(1.262)	(0.481)	(3.972)	(0.772)	(2.347)	(2.372)	(2.924)	(0.879)
country==(UKI) United Kingdom	0.148	-0.805	0.353	-7.883***	6.138	-4.829	0.313	-3.142	-0.558	9.531**	-8.810*	-8.815*	3.440
	(0.601)	(1.047)	(3.983)	(2.012)	(4.561)	(2.941)	(0.591)	(6.854)	(1.036)	(4.272)	(4.906)	(5.217)	(2.087)
Constant	26.86***	27.26***	-5.999	29.96***	42.82**	19.24*	19.61***	31.33	21.28***	13.90	63.37***	41.39**	28.84***
	(4.263)	(5.526)	(17.75)	(6.775)	(19.41)	(9.755)	(3.897)	(26.14)	(5.006)	(25.04)	(23.05)	(18.72)	(9.073)
Observations	81	81	81	81	81	81	81	81	81	81	81	81	81
R-squared	0.743	0.649	0.551	0.737	0.591	0.466	0.665	0.547	0.444	0.475	0.535	0.701	0.844

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.10: Results from OLS estimation of Equation (2): Rural policy categories = f(Overall regional characteristic index, Total Cohesion policy expenditure).

VARIABLES	(1) Total rural policy expenditure	(2) Subsidies on crops	(3) Subsidies on livestock	(4) Support for rural development	(5) Subsidies on intermediate consumption	(6) Decoupled payments	(7) Additional aid	(8) Support Art.68	(9) Other subsidies
Total Cohesion policy expenditure	-0.000793	0.250	-0.143	-0.128	-0.294	0.212	0.120	-0.0545	-0.336*
	(0.105)	(0.167)	(0.236)	(0.140)	(0.194)	(0.159)	(0.0875)	(0.154)	(0.200)
Overall Composite	-8.701	-5.649	1.017	-15.76	-14.75	7.072	6.831	4.989	-1.838
	(6.215)	(10.21)	(10.31)	(10.87)	(10.89)	(12.58)	(6.017)	(8.273)	(12.65)
country==(BGR) Bulgaria	-1.525***	-2.278***	-1.622*	-0.881*	7.589***	-1.788***	-5.639***	0.647	1.626*
	(0.469)	(0.677)	(0.865)	(0.517)	(0.590)	(0.661)	(0.400)	(0.554)	(0.946)
country==(DEU) Germany	0.516	-1.128	-3.411**	0.665	10.11***	0.291	-0.256	-6.206***	-1.952
	(0.714)	(0.714)	(1.415)	(0.653)	(0.666)	(0.855)	(0.453)	(0.244)	(1.569)
country==(ESP) Spain	-1.184**	-0.487	-0.384	-1.531*	5.356***	-1.467**	-0.409	0.607	-0.836
	(0.535)	(0.836)	(0.998)	(0.818)	(0.934)	(0.635)	(0.344)	(0.664)	(1.121)
country==(FRA) France	0.385*	1.439***	0.364	0.0951	6.446***	0.254	0.160	1.975***	1.277***
	(0.216)	(0.298)	(0.462)	(0.346)	(0.412)	(0.278)	(0.152)	(0.297)	(0.418)
country==(HUN) Hungary	-0.595	-0.891	-0.496	0.379	8.915***	-0.615	-5.972***	1.549*	1.995
	(0.638)	(0.844)	(1.235)	(0.747)	(0.818)	(0.808)	(0.410)	(0.787)	(1.356)
country==(ITA) Italy	-1.444***	-1.464*	-4.023***	-0.649	0.245	-1.549***	-0.730**	-0.106	-1.243*
	(0.515)	(0.738)	(1.099)	(0.601)	(0.478)	(0.520)	(0.321)	(0.669)	(0.720)
country==(LUX) Luxembourg	1.062***	-3.423***	-9.673***	2.686***	9.235***	0.532**	0.117	-6.431***	1.592***
	(0.170)	(0.237)	(0.303)	(0.233)	(0.229)	(0.260)	(0.125)	(0.208)	(0.364)
country==(MLT) Malta	-1.251***	0.307	-0.156	0.380	1.062	-2.976***	-6.345***	-6.164***	-0.0181
	(0.313)	(0.539)	(0.716)	(0.471)	(0.649)	(0.547)	(0.296)	(0.487)	(0.562)
country==(POL) Poland	-1.083**	-2.520***	-5.886***	0.366	8.787***	-2.656***	-6.590***	-0.620	2.713***
	(0.492)	(0.827)	(1.713)	(0.733)	(1.037)	(0.897)	(0.463)	(0.767)	(0.852)
country==(POR) Portugal	-1.038*	-0.475	0.551	0.404	5.322***	-5.294	-2.801*	0.433	-1.113
	(0.535)	(0.751)	(1.129)	(0.568)	(1.086)	(3.211)	(1.638)	(1.061)	(1.085)
country==(ROU) Romania	-2.140***	-3.205***	-1.615**	-3.289***	7.125***	-3.084***	-6.232***	-1.811***	0.983
	(0.330)	(0.797)	(0.739)	(1.024)	(0.591)	(0.492)	(0.254)	(0.655)	(0.617)
country==(SUO) Finland	1.128***	1.647***	1.994***	3.074***	0.694*	-0.646*	-0.0971	2.387***	1.389***
	(0.148)	(0.316)	(0.311)	(0.321)	(0.390)	(0.383)	(0.194)	(0.257)	(0.226)
country==(UKI) United Kingdom	0.286	-4.771***	-3.271***	1.169***	1.001***	0.329	0.195	-6.120***	-1.342***
	(0.238)	(0.324)	(0.490)	(0.270)	(0.335)	(0.292)	(0.156)	(0.308)	(0.495)
Constant	15.82***	6.013	11.55**	18.87***	11.89*	4.436	0.665	4.917	14.80***
	(2.728)	(5.686)	(5.168)	(5.983)	(6.845)	(7.109)	(3.526)	(4.519)	(4.528)
Observations	81	81	81	81	81	81	81	81	81
R-squared	0.650	0.615	0.668	0.495	0.814	0.476	0.915	0.861	0.475

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.11: Results from OLS estimation of Equation (2): Rural policy categories = f(Regional indices, Cohesion policy categories).

VARIABLES	(1) Total rural policy expenditure	(2) Subsidies on crops	(3) Subsidies on livestock	(4) Support for rural development	(5) Subsidies on intermediate consumption	(6) Decoupled payments	(7) Additional aid	(8) Support Art.68	(9) Other subsidies
Business support	-0.0391	0.447**	0.292	0.0797	0.183	-0.165	-0.152	0.0716	-0.175
	(0.115)	(0.208)	(0.464)	(0.195)	(0.232)	(0.153)	(0.0958)	(0.172)	(0.332)
Energy	0.00409	0.0814	-0.0207	0.0400	-0.0187	0.0261	0.0149	-0.0178	-0.0357
	(0.0207)	(0.0579)	(0.0517)	(0.0511)	(0.0796)	(0.0313)	(0.0207)	(0.0442)	(0.0658)
Environment and natural resources	0.232***	-0.0454	0.199	0.101	0.0903	0.269***	0.185***	-0.0120	0.487***
	(0.0517)	(0.104)	(0.166)	(0.0754)	(0.0918)	(0.0739)	(0.0371)	(0.0633)	(0.144)
Human resources	-276	-0.0239	-0.0838**	-0.0426	-0.00607	-0.0302	-0.0107	0.000114	-0.0777*
	(0.0167)	(0.0274)	(0.0358)	(0.0272)	(0.0290)	(0.0210)	(0.0131)	(0.0274)	(0.0425)
IT infrastructure and services	0.0441	0.0156	0.0609	0.113**	0.0399	0.00864	0.0106	-0.0155	0.0434
	(0.0379)	(0.0674)	(0.0746)	(0.0535)	(0.0682)	(0.0452)	(0.0276)	(0.0620)	(0.0802)
Research and Technology	-0.0659	0.538*	-0.0414	-0.530*	0.218	0.0766	0.0288	-0.270	-0.381
	(0.167)	(0.305)	(0.380)	(0.292)	(0.336)	(0.209)	(0.143)	(0.230)	(0.381)
Social infrastructure	0.0101	-0.0395	0.0124	0.0469	-0.0433	0.0154	0.0184	0.0387	0.0411
	(0.0189)	(0.0309)	(0.0336)	(0.0318)	(0.0412)	(0.0260)	(0.0173)	(0.0324)	(0.0323)
Technical assistance	0.0460	-0.134	-0.0372	-0.0787	-0.0975	0.00137	-0.0120	0.0262	0.0636
	(0.0404)	(0.0894)	(0.144)	(0.110)	(0.160)	(0.0580)	(0.0326)	(0.0630)	(0.129)
Tourism & Culture	-0.0206	-0.0587	-0.0205	0.0349	-0.00669	-0.0447	-0.0187	-0.0315	-0.0427
	(0.0201)	(0.0385)	(0.0600)	(0.0340)	(0.0479)	(0.0305)	(0.0137)	(0.0324)	(0.0344)
Transport infrastructure	-0.0369	-0.0382	-0.103*	-0.105**	-0.0758	-0.0195	-0.0187	-0.0332	-0.0845*
	(0.0263)	(0.0540)	(0.0560)	(0.0399)	(0.0749)	(0.0358)	(0.0194)	(0.0491)	(0.0480)
Urban and rural regeneration	-0.0278	-0.0734	-0.0874	-0.0340	-0.0434	0.00516	0.00739	0.00866	0.00467
	(0.0330)	(0.0512)	(0.0774)	(0.0431)	(0.0632)	(0.0418)	(0.0280)	(0.0558)	(0.0525)
Other	0.0160	0.115***	0.0452	-0.0752*	-0.0624	-0.404***	-0.182***	-0.121**	0.0179
	(0.0213)	(0.0408)	(0.0536)	(0.0448)	(0.0442)	(0.0620)	(0.0407)	(0.0452)	(0.0646)
RA Index	1.554	-5.130	10.44	4.343	16.26**	0.388	-1.737	0.0874	5.940
	(2.168)	(5.159)	(6.355)	(4.084)	(7.336)	(3.558)	(2.183)	(4.386)	(5.413)
SE Index	-1.411	-1.775	0.00843	-22.00**	-5.908	-4.703	-0.0859	-8.866	-0.670
	(5.907)	(9.764)	(9.838)	(9.410)	(11.50)	(6.979)	(5.106)	(7.229)	(9.362)
SECT Index	-2.586**	-5.266*	-1.641	2.865	-7.259**	-3.557*	-1.584	-3.414	-5.312**
	(1.258)	(2.905)	(3.363)	(3.133)	(2.869)	(1.943)	(1.278)	(2.606)	(2.521)
DIV Index	-3.045	-2.026	4.234	9.518	-10.89	-1.748	1.294	10.96*	1.897
	(3.681)	(5.962)	(5.917)	(5.884)	(8.376)	(5.376)	(2.703)	(5.720)	(5.784)
country==(BGR) Bulgaria	-1.586**	0.760	-1.281	-3.795***	7.310***	-1.616*	-5.514***	0.230	0.997
	(0.747)	(1.223)	(1.454)	(1.089)	(1.167)	(0.930)	(0.706)	(0.855)	(1.444)
country==(DEU) Germany	1.016*	-0.408	-3.496*	-0.318	9.349***	1.254*	0.197	-6.633***	-1.423
	(0.559)	(0.977)	(1.904)	(0.878)	(1.298)	(0.697)	(0.462)	(0.538)	(1.368)
country==(ESP) Spain	-1.765*	0.785	-2.485	-4.945***	3.469	-1.890	-0.618	-0.210	-3.239*
	(1.013)	(1.659)	(1.741)	(1.418)	(2.205)	(1.187)	(0.872)	(1.069)	(1.719)
country==(FRA) France	0.281	2.477***	0.295	-1.226**	5.899***	0.463	0.164	2.050***	1.137
	(0.438)	(0.706)	(0.984)	(0.553)	(0.981)	(0.608)	(0.368)	(0.549)	(0.793)
country==(HUN) Hungary	-1.455**	0.640	-2.436*	-2.112**	7.029***	-1.304	-6.206***	1.058	-0.799
	(0.695)	(1.118)	(1.311)	(0.983)	(1.461)	(0.915)	(0.474)	(0.824)	(1.495)

country==(ITA) Italy	-1.656	-0.746	-5.113***	-3.853***	-0.912	-1.566	-0.765	-1.020	-2.006
	(1.092)	(1.548)	(1.775)	(1.112)	(1.946)	(1.200)	(0.939)	(0.932)	(1.504)
country==(LUX) Luxembourg	-0.168	-3.798***	-13.20***	-0.597	6.940***	-0.123	-0.380	-7.872***	-1.080
	(0.936)	(1.304)	(1.768)	(1.010)	(1.956)	(1.144)	(0.732)	(1.251)	(1.483)
country==(MLT) Malta	-2.377***	1.728*	-1.159	-0.982	0.285	-3.037***	-6.622***	-5.563***	-2.524**
	(0.560)	(0.997)	(1.442)	(0.835)	(1.147)	(0.827)	(0.380)	(0.873)	(1.205)
country==(POL) Poland	-1.756***	-1.356	-7.434***	-1.748**	8.434***	-1.876**	-6.350***	-0.0782	1.000
	(0.604)	(1.124)	(1.666)	(0.866)	(1.437)	(0.795)	(0.432)	(0.851)	(1.362)
country==(POR) Portugal	-1.625*	0.344	-0.713	-1.859**	4.904***	-2.586**	-1.622*	0.848	-2.444
	(0.883)	(1.550)	(1.472)	(0.925)	(1.598)	(1.174)	(0.890)	(1.054)	(1.595)
country==(ROU) Romania	-3.250***	-1.702	-4.114***	-6.920***	6.144***	-2.539***	-5.903***	-1.323	-0.780
	(0.640)	(1.272)	(1.515)	(1.336)	(1.541)	(0.918)	(0.605)	(1.098)	(1.468)
country==(SUO) Finland	1.354**	2.735***	2.050*	1.423**	1.008	0.603	0.261	1.774***	1.939**
	(0.513)	(0.802)	(1.045)	(0.697)	(1.135)	(0.638)	(0.458)	(0.509)	(0.775)
country==(UKI) United Kingdom	1.496*	-4.473***	-2.339	0.812	0.00234	2.152*	1.355*	-5.251***	1.834
	(0.816)	(1.343)	(1.566)	(1.028)	(1.852)	(1.115)	(0.747)	(1.015)	(1.244)
Constant	11.82***	0.181	-0.0643	21.89***	-3.259	12.62***	6.057**	12.03**	9.216
	(2.914)	(6.335)	(8.215)	(6.632)	(6.671)	(3.896)	(2.629)	(5.504)	(7.608)
Observations	81	81	81	81	81	81	81	81	81
R-squared	0.811	0.771	0.775	0.732	0.873	0.869	0.967	0.893	0.663

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.12: Results from OLS estimation of Equation (1): Cohesion policy categories = f(Overall regional characteristic index, Total Rural policy expenditure, Interaction term)

VARIABLES	(1) Total cohesion policy	(2) Business support	(3) Energy	(4) Environment and natural resources	(5) Human resources	(6) IT infrastructure and services	(7) Research and Technology	(8) Social infrastructure	(9) Technical assistance	(10) Tourism and Culture	(11) Transport infrastructure	(12) Urban and rural regeneration	(13) Other
Total rural policy expenditure	-3.943*	-4.559	-6.766	-16.01**	-32.01**	-8.756	-1.688	-24.29	0.657	-22.75**	-25.15**	-1.769	7.166
	(2.067)	(3.184)	(9.442)	(7.267)	(12.88)	(6.883)	(2.292)	(18.01)	(4.695)	(11.27)	(12.39)	(7.015)	(8.767)
Overall Composite	-111.5**	-141.8*	-198.4	-448.4**	-825.9**	-266.1	-43.86	-736.1*	3.270	-528.5**	-720.4**	-69.30	136.3
	(51.26)	(81.54)	(228.9)	(195.4)	(313.0)	(171.9)	(57.28)	(430.7)	(114.6)	(253.5)	(309.3)	(171.2)	(192.6)
Total rural policy expenditure * Overall Composite	8.683*	10.42	14.28	38.08**	68.22**	22.63	3.921	54.92	-0.751	47.59*	56.50**	1.661	-15.56
	(4.381)	(7.013)	(20.01)	(17.01)	(28.23)	(15.20)	(4.799)	(39.06)	(9.870)	(23.90)	(26.33)	(15.31)	(18.98)
country==(BGR) Bulgaria	2.067***	1.593**	0.641	5.053***	11.18***	1.055	0.170	12.96***	3.422***	15.31***	1.544	-1.366	-1.207
	(0.492)	(0.690)	(1.497)	(0.892)	(1.841)	(1.413)	(0.509)	(2.434)	(0.774)	(1.445)	(2.855)	(2.218)	(0.932)
country==(DEU) Germany	1.731***	1.790***	0.0703	0.661	11.23***	-3.148	1.120**	13.63***	-0.492	15.16***	-0.362	1.386	-0.418
	(0.399)	(0.625)	(2.775)	(1.089)	(2.453)	(2.259)	(0.513)	(1.279)	(2.559)	(1.719)	(2.826)	(1.015)	(0.604)
country==(ESP) Spain	2.106***	0.313	-6.204**	4.533***	-3.955**	4.191***	1.866***	2.204	0.875	11.62***	-3.150	-2.047	-0.652
	(0.583)	(0.760)	(2.809)	(0.845)	(1.851)	(1.024)	(0.562)	(3.077)	(0.830)	(2.781)	(4.031)	(2.479)	(0.928)
country==(FRA) France	1.289***	0.567*	2.069***	2.001***	9.944***	1.727***	0.817***	5.656***	1.106***	14.03***	1.067	-1.568	-0.716
	(0.186)	(0.285)	(0.572)	(0.376)	(1.763)	(0.507)	(0.195)	(2.009)	(0.274)	(1.279)	(0.780)	(1.390)	(0.634)
country==(HUN) Hungary	3.275***	2.886***	1.729	5.713***	-1.707	2.839***	1.437***	14.18***	4.032***	19.51***	1.894	0.667	-2.631
	(0.327)	(0.447)	(1.552)	(0.655)	(2.064)	(0.982)	(0.372)	(2.925)	(0.494)	(2.105)	(2.439)	(2.471)	(1.985)
country==(ITA) Italy	1.741***	1.234	1.497	3.686***	4.311*	1.949	1.342*	5.574**	2.515***	15.01***	-4.197	-5.186	-0.770
	(0.586)	(0.895)	(1.407)	(0.876)	(2.348)	(1.839)	(0.724)	(2.708)	(0.907)	(1.332)	(3.867)	(3.149)	(0.776)
country==(LUX) Luxembourg	-0.658***	-2.084***	2.004**	-1.765	-0.451	-4.450***	-0.936***	-0.124	-0.656*	-0.963	-14.59***	-13.13***	1.339
	(0.227)	(0.443)	(0.905)	(1.086)	(1.668)	(0.873)	(0.257)	(2.052)	(0.376)	(1.289)	(1.564)	(1.522)	(1.159)
country==(MLT) Malta	3.449***	2.357***	4.070***	7.989***	0.517	5.629***	1.435***	21.48***	2.843***	17.76***	7.627***	-0.256	0.186
	(0.240)	(0.462)	(0.782)	(1.138)	(1.511)	(0.872)	(0.270)	(1.160)	(0.430)	(0.977)	(1.256)	(0.936)	(0.299)
country==(POL) Poland	5.230***	4.415***	4.816***	8.728***	1.288	8.016***	3.719***	22.88***	5.467***	18.10***	10.79***	2.404***	0.373
	(0.524)	(0.475)	(0.800)	(1.412)	(1.600)	(1.207)	(0.517)	(1.742)	(0.885)	(1.021)	(1.803)	(0.866)	(0.344)
country==(POR) Portugal	3.800***	3.009***	-4.208	6.595***	7.778	4.815***	2.671***	18.40***	3.603***	17.00***	4.774**	-4.274	5.168
	(0.617)	(0.675)	(5.248)	(0.983)	(4.865)	(1.377)	(0.944)	(2.456)	(0.670)	(0.958)	(2.035)	(6.244)	(4.990)
country==(ROU) Romania	3.009***	3.167***	1.774	8.618***	0.956	5.550***	0.230	19.55***	2.867***	15.41***	7.398***	-17.27***	-0.190
	(0.463)	(0.810)	(1.316)	(1.747)	(3.233)	(1.492)	(0.771)	(2.451)	(0.833)	(1.656)	(2.495)	(1.776)	(0.524)
country==(SUO) Finland	1.227***	1.451***	1.361	-0.643	15.42***	-1.044	0.771***	14.97***	1.360***	14.80***	0.773	-1.740	1.373
	(0.239)	(0.468)	(0.942)	(1.157)	(1.754)	(0.922)	(0.270)	(2.140)	(0.396)	(1.339)	(1.631)	(1.580)	(1.197)
country==(UKI) United Kingdom	1.668***	0.0624	1.672***	-2.787***	11.36***	2.171***	1.895***	-1.448	0.413*	17.90***	1.830***	-6.267***	-0.763
	(0.112)	(0.147)	(0.521)	(0.215)	(0.714)	(0.353)	(0.117)	(0.871)	(0.217)	(0.770)	(0.639)	(0.557)	(0.612)
Constant	67.95***	77.95**	107.6	202.2**	387.3***	116.5	35.48	327.4	8.616	253.2**	335.5**	58.91	-62.62
	(24.22)	(37.14)	(108.1)	(83.40)	(142.8)	(77.80)	(27.41)	(198.9)	(54.57)	(120.0)	(146.2)	(79.65)	(88.99)
Observations	81	81	81	81	81	81	81	81	81	81	81	81	81
R-squared	0.509	0.433	0.329	0.682	0.510	0.359	0.356	0.457	0.276	0.397	0.337	0.581	0.241

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.13: Results from OLS estimation of Equation (1): Rural policy categories = f(Overall regional characteristic index, Total Cohesion policy expenditure, Interaction term)

VARIABLES	(1) Total rural policy expenditure	(2) Subsidies on crops	(3) Subsidies on livestock	(4) Support for rural development	(5) Subsidies on intermediate consumption	(6) Decoupled payments	(7) Additional aid	(8) Support Art.68	(9) Other subsidies
Total Cohesion policy expenditure	-3.272	-1.792	-4.248	-1.056	-7.099**	-9.134***	-5.046***	-3.580*	-10.13**
	(2.395)	(2.472)	(3.732)	(2.895)	(2.762)	(3.148)	(1.510)	(2.123)	(4.464)
Overall Composite	-154.9	-96.90	-182.5	-57.20	-318.9***	-410.6***	-224.1***	-152.6	-439.4**
	(113.0)	(109.3)	(176.0)	(131.6)	(119.0)	(136.8)	(65.89)	(92.68)	(202.5)
Total cohesion policy expenditure * Overall Composite	7.559	4.719	9.488	2.143	15.73**	21.60***	11.94***	8.149*	22.63**
	(5.657)	(5.629)	(8.933)	(6.879)	(6.312)	(7.390)	(3.547)	(4.866)	(10.42)
country==(BGR) Bulgaria	-2.027***	-2.591***	-2.251*	-1.023	6.545***	-3.221***	-6.432***	0.107	0.125
	(0.737)	(0.727)	(1.286)	(0.784)	(0.508)	(0.692)	(0.386)	(0.563)	(1.149)
country==(DEU) Germany	0.299	-1.264*	-3.683***	0.604	9.659***	-0.330	-0.599**	-6.441***	-2.603**
	(0.651)	(0.636)	(1.331)	(0.719)	(0.396)	(0.498)	(0.259)	(0.303)	(1.282)
country==(ESP) Spain	-1.491**	-0.679	-0.770	-1.618*	4.717***	-2.345***	-0.895***	0.276	-1.757
	(0.671)	(0.818)	(1.223)	(0.874)	(0.832)	(0.538)	(0.289)	(0.648)	(1.137)
country==(FRA) France	-0.0186	1.187***	-0.143	-0.0194	5.606***	-0.900*	-0.478**	1.539***	0.0687
	(0.463)	(0.401)	(0.821)	(0.559)	(0.504)	(0.458)	(0.228)	(0.361)	(0.734)
country==(HUN) Hungary	-0.726	-0.973	-0.661	0.342	8.642***	-0.990	-6.179***	1.407*	1.601
	(0.659)	(0.817)	(1.311)	(0.787)	(0.660)	(0.617)	(0.321)	(0.739)	(1.163)
country==(ITA) Italy	-1.801**	-1.687**	-4.470***	-0.750	-0.497	-2.568***	-1.293***	-0.490	-2.310**
	(0.716)	(0.775)	(1.454)	(0.791)	(0.428)	(0.554)	(0.347)	(0.708)	(1.053)
country==(LUX) Luxembourg	1.650***	-3.056***	-8.935***	2.853***	10.46***	2.213***	1.046***	-5.797***	3.352***
	(0.562)	(0.479)	(0.882)	(0.596)	(0.449)	(0.510)	(0.250)	(0.388)	(0.906)
country==(MLT) Malta	-2.052**	-0.194	-1.161	0.152	-0.605	-5.265***	-7.610***	-7.028***	-2.416*
	(0.792)	(0.719)	(1.490)	(1.083)	(0.833)	(1.081)	(0.531)	(0.670)	(1.364)
country==(POL) Poland	-2.537*	-3.428***	-7.712***	-0.0460	5.760***	-6.813***	-8.887***	-2.188*	-1.642
	(1.411)	(1.234)	(2.734)	(1.857)	(1.608)	(2.088)	(1.005)	(1.141)	(2.490)
country==(POR) Portugal	-1.764*	-0.928	-0.361	0.198	3.809***	-7.370**	-3.950**	-0.351	-3.288**
	(0.944)	(0.842)	(1.814)	(1.078)	(0.824)	(3.241)	(1.656)	(1.068)	(1.486)
country==(ROU) Romania	-2.785***	-3.607***	-2.424*	-3.472***	5.784***	-4.925***	-7.250***	-2.506***	-0.946
	(0.703)	(0.807)	(1.334)	(1.228)	(0.675)	(0.890)	(0.434)	(0.755)	(1.179)
country==(SUO) Finland	0.969***	1.548***	1.794***	3.029***	0.363	-1.101**	-0.349	2.215***	0.912**
	(0.205)	(0.330)	(0.433)	(0.414)	(0.426)	(0.460)	(0.218)	(0.283)	(0.389)
country==(UKI) United Kingdom	-0.162	-5.051***	-3.834***	1.042*	0.0683	-0.952*	-0.513**	-6.603***	-2.684***
	(0.510)	(0.414)	(0.910)	(0.583)	(0.367)	(0.488)	(0.248)	(0.371)	(0.820)
Constant	79.56	45.80	91.55	36.94	144.5***	186.6***	101.3***	73.63*	205.6**
	(48.47)	(48.30)	(74.52)	(55.98)	(52.47)	(58.68)	(28.25)	(40.68)	(87.48)
Observations	81	81	81	81	81	81	81	81	81
R-squared	0.685	0.620	0.679	0.496	0.833	0.580	0.933	0.868	0.569

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4. Summary and Concluding Remarks

This report analysed the relationship between EU cohesion policy and rural policy over the 2007-2013 programming period. Although at a correlation level some cases of positive interactions have been found (e.g. Business Support policy with the three rural policies Support for rural development, subsidies on intermediate consumption, and decoupled payments) in more instances a negative correlation between policy areas has been found (between Additional Aid, Support from Article 68, and Other subsidies, and cohesion policies such as, Environment and natural resources, Tourism & Culture, and Transport infrastructure). Therefore, the empirical evidence seems to confirm that these policy areas, rather than converging toward the regional development goal, are possibly acting as substitutes. In other words, the policy mechanism is such that a trade-off arises where one policy is used in place of funding that is absent.

When more formally tested by means of a (set of) regression estimations that take into account structural characteristics, the overall picture shows that no significant relationship between Total Cohesion policy and Total Rural policy can be statistically detected. However, when a more granular approach is followed, the evidence is not so clear-cut. Indeed, when cohesion policy is disaggregated, Total Rural policy has a positive and significant impact on IT infrastructure and services policy. Furthermore, disaggregating Rural policy does show nuances of synergy between subcategories of cohesion and rural policy.

Finally, when the above synergies are further explored to test if they depend on structural characteristics of territories, the analysis shows that structurally disadvantaged regions attract expenditure synergies between Total Rural policy and Total Cohesion policy, therefore, providing evidence to support the presence of 'pro-cohesion' policies that exert a cumulative impact by focussing on structurally disadvantaged regions. Nonetheless, as mentioned in introduction the extent of the positive spillovers between policies, or even the perception of the overall positive effects remain an open issue potentially able to provide insights on crucial issues such as the spatial divide in the Brexit referendum results.

5. References

Bandura, R. (2005). *Measuring country performance and state behavior: A survey of composite indices*. New York: Office of Development Studies, United Nations Development Programme (UNDP).

Barca, Fabrizio. 2009. "*An Agenda for A Reformed Cohesion Policy: A Place-Based Approach to Meeting European Union Challenges and Expectations*," Independent Report, Prepared at the Request of the European Commissioner for Regional Policy, Danuta Hübner, European Commission, Brussels.

Barca, F., McCann, P., & Rodríguez-Pose, A. (2012). The case for regional development intervention: place-based versus place-neutral approaches. *Journal of regional science*, *52*(1), 134-152.

Bolton, Roger. 1992 "'Place Prosperity vs People Prosperity' Revisited: An Old Issue with a New Angle," *Urban Studies*, **29**(2), 185–203.

Booysen, F. (2002). An overview and evaluation of composite indices of development. *Social Indicators Research*, 59(2), 115-151.

Crescenzi, R., De Filippis, F., & Pierangeli, F. (2015). In tandem for cohesion? Synergies and conflicts between regional and agricultural policies of the European Union. *Regional Studies*, **49**(4), 681-704.

Decancq, K., & Lugo, M. A. (2013). Weights in multidimensional indices of wellbeing: An overview. *Econometric Reviews*, 32(1), 7-34.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, 38(10), 1091-1110.

EUROPEAN COMMISSION (2013) Refocusing EU Cohesion Policy for Maximum Impact on Growth and Jobs: The Reform in 10 Points. MEMO/13/1011 19/11/2013. European Commission, Brussels

Freudenberg, M. (2003). *Composite Indicators of Country Performance: A Critical Assessment*. OECD Publishing, Paris.

Greco, S., Ishizaka, A., Matarazzo, B. & Torrisi, G. (2017). Stochastic Multiattribute Acceptability Analysis: an application to the ranking of Italian regions. MPRA_paper_75663, Submitted.

Greyling, T., & Tregenna, F. (2016). Construction and analysis of a composite quality of life index for a region of South Africa. *Social Indicators Research*, 1-44.

Hermans, E., Van den Bossche, F., & Wets, G. (2008). Combining road safety information in a performance index. *Accident Analysis & Prevention*, 40(4), 1337-1344.

Klasen, S. (2000). Measuring poverty and deprivation in South Africa. *Review of Income and Wealth*, 46(1), 33-58.

Krishnakumar, J., & Nagar, A. L. (2008). On exact statistical properties of multidimensional indices based on principal components, factor analysis, MIMIC and structural equation models. *Social Indicators Research*, 86(3), 481-496.

Lagendijk, Arnoud and James Cornford. 2000. "Regional Institutions and Knowledge—Tracking New Forms of Regional Development Policy," Geoforum, 31(2), 209–218.

Mariano, R. S., & Murasawa, Y. (2003). A new coincident index of business cycles based on monthly and quarterly series. *Journal of applied Econometrics*, 18(4), 427-443.

McGillivray, M. (2005). Measuring non-economic well-being achievement. *Review of Income and Wealth*, 51(2), pp. 337–364.

Nicoletti, G., Scarpetta, S., & Boylaud, O. (2000). *Summary Indicators of Product Market Regulation with an Extension to Employment Protection Legislation*. OECD Economics Department Working Papers, No. 226, OECD Publishing, Paris.

Organisation for Economic Co-operation and Development (OECD) (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris: Organisation for Economic Co-operation and Development

Pike, Andy, Andrés Rodríguez-Pose, and John, Tomaney. 2006. *Local and Regional Development*. London : Routledge.

Ram, R. (1982). Composite indices of physical quality of life, basic needs fulfilment, and income: A 'principal component' representation. *Journal of Development Economics*, 11(2), 227-247.

Roberts, Peter. 1993. "Managing the Strategic Planning and Development of Regions: Lessons from a European Perspective," *Regional Studies*, **27**, 759–768.

Saisana, M., & Tarantola, S. (2002). *State-of-the-art report on current methodologies and practices for composite indicator development*. European Commission, Joint Research Centre, Institute for the Protection and the Security of the Citizen, Technological and Economic Risk Management Unit.

Saltelli, A. (2007). Composite indicators between analysis and advocacy. *Social Indicators Research*, 81(1), 65-77.

Sapir, Andre, Philippe Aghion, Giuseppe Bertola, Martin Hellwig, Jean Pisani-Ferry, Dariusz Rosati, J. Viñals, and Helen Wallace. 2004. *An Agenda for a Growing Europe: The Sapir Report*. Oxford : Oxford University Press.

World Bank. 2009. *World Development Report 2009: Reshaping Economic Geography*. Washington , DC : World Bank.

6. Appendix

6.1 A composite index of structural disadvantage at EU regional level

Composite indicators have met with an astounding popularity in recent times (Bandura, 2005). Their ability to synthesise a plethora of information into a single value provide them with a great appeal to be used in benchmarking exercises (OECD, 2008), but also to serve as monitoring tools for policymakers (Saltelli, 2007). During their construction, there is a sequence of steps to be followed and admittedly, not a single one of them is free from criticism (Booysen, 2002). Nevertheless, the paramount criticism is mainly located in two of these steps, namely the weighting and aggregation – with the first being the most pernicious (Freudenberg, 2003; Decancq and Lugo, 2013). There is a wide variety of approaches in the literature that deal with these issues (OECD, 2008). In the context of weighting, data-driven techniques such as the use, or combination of Principal Component Analysis (PCA) and Factor Analysis (FA) are considered as more 'objective' by the literature (Booysen, 2002; OECD, 2008; Decancq and Lugo, 2013), in the sense that they do not involve the exercise of a decision maker subjectively setting the weights according to her beliefs. Moreover, these techniques deal, up to some extent, with the issue of correlation among the indicators as they use it to 'merge' the variables in such a way to incorporate the maximum variation in the original dataset with as less components possible (reductionist approach). Of course, one should note here that this is both an advantage and a drawback, as in the absence of correlation these techniques would fail to work (Saisana and Tarantola, 2002). Nevertheless, these

approaches are popular in the literature to elicit the weights, especially in the context of well-being and poverty[1]. Moreover, several official indicators provided by large organisations are constructed using these approaches (e.g. see Saisana and Tarantola, 2002 for the Internal Market Index, Science and Technology Indicator, Business Climate Indicator, Relative Intensity of regional problems; see Bandura, 2008 for Environmental Degradation Index), while they are also often encountered in the literature (see Klasen, 2000; Nicoletti et al., 2000; Mariano and Murasawa, 2003; McGillivray, 2005; Dreher, 2006; Hermanns et al., 2008; Greyling and Tregenna, 2013).

Essentially, PCA and FA are two statistical approaches with the aim of reductionism (OECD, 2008). Their objective is to capture as much of the variance as possible in the original indicators with as less components possible (Ram, 1982). To achieve this, the original data (standardised for this exercise) are transformed in such a way through linear combinations of the dataset to achieve this very purpose (see OECD, 2008 for a more detailed explanation). Their use in the context of constructing a composite index is often only limited to the elicitation of weights using the factor loadings obtained from the first principal component (Klasen, 2000). However, in some instances the first component cannot achieve the desired target that is to explain an adequate amount of variation in the original dataset (Ram, 1982) and more components are needed. In this case other alternatives must be used (Greyling and Tregenna, 2013). Such an alternative was firstly introduced by Nicoletti et al. (2000)

[1] For a review of the literature, see Krishnakumar and Nagar (2008).

to measure the strictness of regulations in the OECD countries. The authors construct a composite index by a means of factor analysis, where each component is weighted in regard to the contribution it offers in explaining the total variance. A more detailed analysis of this method can be found in the original work of the authors (Nicoletti et al., 2000), but also in the 'Handbook for Constructing Composite Indicators' provided by the OECD (2008). This is the only methodology taking into account not only the variation of the first component, but also of the subsequent components needed (Greyling and Tregenna, 2013) and hence, the one we use for this exercise as it is deemed necessary by our analysis that follows suit.

Using the indicators from the rural development report 2013 ("Rural Development in the EU – Statistical and Economic Information Report 2013"), we intend to build a composite indicator that encompasses the plethora of information provided in this rich dataset. Originally, the 121 total indicators and sub-indicators in the dataset are grouped into five dimensions, namely '*Importance of rural areas*', '*Socio-economic situation of rural areas*', '*Sectoral economic indicators*', '*Environment*', '*Diversification and quality of life in rural areas*'. For the purpose of having a strongly balanced dataset (*viz*. no missing values across the NUTS2 regions in all the indicators), we are finally left with 42 of them. The deduction was roughly equal among the dimensions, with the exception of the '*Environment*' dimension which due to many cases of missing values is entirely removed when the balanced dataset is constructed. Moving onto the construction of the composite index, we first need to standardise the variables using the z-score method – as required for their use in

the PCA/FA exercise – and for the construction of the final composite index, we then rescale these to fall into the [0,1] set[2].

Following Nicoletti et al. (2000), we will fuse FA to construct the overall composite indicator of rural development first and then to construct four individual composite indices (one per each dimension in the dataset). As suggested by the authors, for the extraction of the factors, PCA will be used, and a rotation of the factors using the '*varimax*' approach afterwards, in order to minimise the number of indicators with high loadings on the same factor. Finally, in align with the standard practice (OECD 2008, p.89), the factors that were retained had to fulfil the following criteria: (i) have eigenvalues larger than unity, (ii) cumulatively contribute to the explanation of the overall variance by at least 60%. Another criterion commonly applied is that of the factors individually contributing to the explanation of the original dataset by at least 10%. However, in this instance this would result in losing a huge portion of information provided in the original dataset and therefore, it was avoided. According to the aforementioned criteria, the results stemmed from FA are given in Table 1. As shown in the table, the 42 indicators are correlated with 11 main factors (grey-shaded area) that account for 86.3% of the overall variance in the original dataset. Additionally, this is confirmed by figure 1, which shows the so-called "*screeplot*", the eigenvalues in each of the components. Judging from the "elbow" in the figure, 11

[2] After the use of PCA/FA to elicit the weights, we intend to use the indicators' values to construct a composite index to exhibit an overall score. Since the standardisation of the indicators using z-score produces also negative values, we re-scale the indicators to fall in the [0,1] set of numbers as in the study of Greco, Ishizaka, Matarazzo and Torrisi (2017). The objective is for the final composite index to exhibit a more meaningful overall score within this exact set, with higher values indicating higher performance and vice-versa.

components are overall enough to extract. The varimax rotation's output is shown in table 2, containing the extracted 11 factors, their new eigenvalues after the rotation and the weights of each factor in the overall composite index[3]. Table 3 contains the loadings obtained from the rotated factors extracted. Essentially, by squaring these and scale them to sum to unity, we obtain the weights that are to be used to aggregate the individual indicators into intermediate composite indices. These are disclosed in table 4, and may be easily interpreted, given that the squared normalised loadings express the proportion of the variance that is explained by an indicator in each factor. Using the weights of table 4, we construct the 11 intermediate indices (one per retained factor), which in turn are weighted by the proportion each one of them explains in the total variance of the retained factors (disclosed in Table 2) and then further aggregated into constructing the overall composite index of rural development.

The same procedure was followed to construct four more composite indicators, one for each dimension in the original dataset. This way instead of producing an overall index of rural development, we produce four composite indicators measuring the '*Importance of rural areas*', the '*Socio-economic situation of rural areas*', the performance of '*Sectoral economic indicators*', and the '*Diversification and quality of life in rural areas*'. These capture 96.71%, 90.26%, 69.26% and 70.25% of the variation in these subsets of indicators accordingly. The factor analysis results, the

[3] These are calculated by dividing the variance explained per each factor with the total cumulative variance explained by all the factors combined (which is roughly equal to 88.4%). For a more detailed and comprehensive analysis of the steps followed in the procedure, the reader is referred to the original work of Nicoletti et al. (2000), or the study of Greyling and Tregenna (2013).

factor loadings and the weights for each sub-indicator are presented in tables 5 to 17, while their “screeplots” are grouped together in figure 2.

Factor #	Eigenvalue	Variance explained	Cumulative variance explained	Factor #	Eigenvalue	Variance explained	Cumulative variance explained
1	8.40	0.20	0.20	22	0.12	0.00	0.99
2	6.73	0.16	0.36	23	0.09	0.00	0.99
3	5.35	0.13	0.49	24	0.08	0.00	1.00
4	4.27	0.10	0.59	25	0.05	0.00	1.00
5	3.06	0.07	0.66	26	0.04	0.00	1.00
6	2.20	0.05	0.71	27	0.03	0.00	1.00
7	2.02	0.05	0.76	28	0.03	0.00	1.00
8	1.59	0.04	0.80	29	0.02	0.00	1.00
9	1.26	0.03	0.83	30	0.02	0.00	1.00
10	1.21	0.03	0.86	31	0.01	0.00	1.00
11	1.02	0.02	0.88	32	0.00	0.00	1.00
12	0.89	0.02	0.90	33	0.00	0.00	1.00
13	0.67	0.02	0.92	34	0.00	0.00	1.00
14	0.60	0.01	0.94	35	0.00	0.00	1.00
15	0.48	0.01	0.95	36	0.00	0.00	1.00
16	0.45	0.01	0.96	37	0.00	0.00	1.00
17	0.36	0.01	0.97	38	0.00	0.00	1.00
18	0.31	0.01	0.97	39	0.00	0.00	1.00
19	0.27	0.01	0.98	40	0.00	0.00	1.00
20	0.23	0.01	0.99	41	0.00	0.00	1.00
21	0.13	0.00	0.99	42	0.00	0.00	1.00

Table A1. Factor Analysis results (Extraction method: Principal Component Analysis)

Factor #	Eigenvalue	Variance explained	Cumulative variance explained	Weights of factors in composite
1	6.20194	0.1477	0.1477	0.17
2	5.85834	0.1395	0.2871	0.16
3	5.76366	0.1372	0.4244	0.16
4	4.3922	0.1046	0.529	0.12
5	3.93733	0.0937	0.6227	0.11
6	2.2918	0.0546	0.6773	0.06
7	1.95699	0.0466	0.7239	0.05
8	1.85658	0.0442	0.7681	0.05
9	1.74948	0.0417	0.8097	0.05
10	1.68675	0.0402	0.8499	0.05
11	1.41662	0.0337	0.8836	0.04

Table A2. Factor Analysis results (Rotated factors using varimax rotation)

Rotated Factor Loadings (1/2)											
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor6**	**Factor7**	**Factor8**	**Factor9**	**Factor10**	**Factor11**
ra1	0.18	-0.61	-0.14	0.71	-0.10	-0.06	-0.04	-0.01	0.03	-0.04	0.02
ra2	-0.11	-0.16	0.00	-0.96	0.05	0.01	-0.01	0.04	-0.02	-0.01	0.01
ra3	-0.10	0.91	0.17	0.17	0.08	0.05	0.06	-0.04	-0.01	0.06	-0.03
ra4	0.14	-0.59	-0.16	0.72	-0.09	-0.21	-0.05	0.03	0.01	0.01	0.01
ra5	-0.03	-0.34	-0.05	-0.92	0.00	-0.11	0.02	-0.01	0.03	-0.02	-0.02
ra6	-0.11	0.88	0.20	0.18	0.08	0.30	0.02	-0.02	-0.04	0.01	0.01
ra10	0.12	-0.59	-0.15	0.72	-0.09	-0.21	-0.05	0.05	0.01	0.02	0.01
ra11	-0.03	-0.36	-0.07	-0.91	0.00	-0.13	0.02	-0.01	0.04	-0.02	-0.02
ra12	-0.08	0.87	0.20	0.18	0.09	0.31	0.03	-0.03	-0.05	0.00	0.02
se1	0.23	0.81	0.15	0.05	0.08	-0.12	-0.06	-0.05	0.09	0.10	-0.11
se2	0.05	0.69	0.22	0.03	0.31	-0.16	0.16	0.06	0.08	0.22	-0.15
se3	0.06	-0.20	0.19	0.05	0.74	0.29	0.23	-0.01	-0.16	0.32	0.07
se4	-0.14	0.42	-0.37	-0.13	0.48	-0.27	-0.23	-0.02	0.17	-0.38	-0.07
se5	0.07	-0.20	0.17	0.07	-0.95	0.01	0.02	0.02	-0.02	0.08	0.01
se6	0.09	-0.25	0.21	0.10	-0.91	0.06	0.07	0.03	-0.05	0.14	0.01
se7	0.00	0.03	0.00	-0.01	0.95	0.17	0.10	-0.01	-0.07	0.14	0.02
se16	0.00	-0.16	-0.97	0.03	0.04	-0.04	-0.09	-0.03	-0.02	-0.03	-0.03
se17	0.05	-0.27	-0.29	0.00	-0.02	-0.05	0.09	0.04	-0.11	-0.85	0.15
se18	-0.03	0.24	0.86	-0.03	-0.02	0.05	0.03	0.01	0.07	0.41	-0.05
se22	0.64	0.11	0.17	0.00	-0.10	0.05	0.56	0.08	-0.24	-0.02	-0.02
se23	0.94	-0.03	-0.03	0.10	-0.03	-0.05	-0.13	-0.04	0.03	0.07	0.09
se24	0.94	-0.02	-0.06	0.12	-0.04	0.03	0.13	0.06	-0.03	-0.09	0.02

Rotated Factor Loadings (2/2)											
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor6**	**Factor7**	**Factor8**	**Factor9**	**Factor10**	**Factor11**
se25	0.95	-0.08	-0.03	0.12	-0.07	0.02	-0.09	-0.06	-0.05	-0.01	0.01
se26	0.89	0.00	0.01	0.07	0.01	0.00	0.38	0.05	-0.02	-0.07	0.03
se28	0.21	0.09	0.25	-0.09	0.19	-0.07	0.84	0.00	0.07	-0.04	-0.13
sect1	0.10	-0.03	-0.88	-0.04	0.17	0.25	0.04	-0.05	0.23	0.03	0.02
sect2	0.00	-0.16	-0.97	0.03	0.04	-0.04	-0.09	-0.03	-0.02	-0.03	-0.03
sect27	-0.40	-0.17	0.03	0.18	0.14	-0.36	0.04	0.09	-0.04	0.52	0.40
sect28	-0.27	-0.31	-0.23	0.07	-0.03	-0.30	0.27	-0.12	-0.39	-0.06	0.50
sect29	0.08	-0.04	0.10	0.00	0.03	0.08	-0.16	-0.06	0.16	-0.09	0.86
div1	0.25	0.09	-0.15	0.08	-0.08	-0.25	-0.22	0.06	-0.67	-0.11	-0.05
div2	0.02	0.35	0.15	0.01	0.20	0.78	-0.03	-0.13	-0.02	0.03	-0.03
div3	0.00	0.16	0.97	-0.03	-0.04	0.04	0.09	0.03	0.02	0.03	0.03
div8	-0.05	0.26	-0.20	0.00	0.08	0.83	-0.05	-0.03	0.27	-0.01	0.06
div9	-0.34	-0.04	-0.33	0.06	-0.25	0.15	-0.12	0.15	0.70	0.01	0.20
div10	0.51	0.19	0.31	0.04	0.33	-0.08	0.19	-0.02	0.30	0.12	-0.20
div15	0.35	0.05	0.20	0.01	-0.07	-0.15	0.26	0.39	0.37	0.24	0.00
div16	0.79	-0.29	-0.10	0.06	-0.02	0.00	-0.21	0.00	-0.05	0.10	-0.13
div17	0.70	0.03	-0.06	-0.06	-0.02	-0.07	0.21	-0.37	-0.28	-0.16	-0.14
div18	0.03	-0.08	0.36	0.04	-0.13	-0.17	-0.07	0.74	0.06	0.11	0.14
div19	-0.37	0.13	0.45	-0.11	-0.10	0.01	0.44	0.30	0.14	-0.03	-0.01
div20	-0.11	-0.05	-0.05	-0.02	0.02	-0.01	0.08	0.90	0.00	-0.09	-0.15

Table A3. Loadings of the rotated factors

Weights of variables in factor (1/2) [Squared factor loadings of chosen indicators, scaled to unity sum]											
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor6**	**Factor7**	**Factor8**	**Factor9**	**Factor10**	**Factor11**
ra1	0.00	0.10	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra2	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra3	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra4	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra5	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra6	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra10	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra11	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ra12	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se1	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se2	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se3	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00
se4	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
se5	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00
se6	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00
se7	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00
se16	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00
se18	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se22	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se23	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se24	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Weights of variables in factor (1/2) [Squared factor loadings of chosen indicators, scaled to unity sum]											
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor6**	**Factor7**	**Factor8**	**Factor9**	**Factor10**	**Factor11**
se25	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se26	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
se28	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0.00	0.00
sect1	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
sect2	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
sect27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00
sect28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
sect29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75
div1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00
div2	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00
div3	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
div8	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00
div9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00
div10	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
div15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
div16	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
div17	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
div18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00
div19	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
div20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00

Table A4. Weights of variables in the factors (squared loadings of rotated factors scaled to sum to unity)

Factor #	Eigenvalue	Variance explained	Cumulative variance explained
1	4.4866	0.4985	0.4985
2	4.21696	0.4686	0.9671
3	0.18166	0.0202	0.9872
4	0.10973	0.0122	0.9994
5	0.00281	0.0003	0.9998
6	0.00224	0.0002	1
7	0	0	1
8	0	0	1
9	0	0	1

Table A5. Importance of Rural Areas - Factor Analysis results (Extraction method: Principal Component Analysis)

Factor #	Variance	Proportion	Cumulative	Weights of factors in composite
Factor1	4.46362	0.496	0.496	0.513
Factor2	4.23994	0.4711	0.9671	0.487

Table A6. Importance of Rural Areas - Factor Analysis results (Rotated factors using varimax rotation)

Rotated Factor Loadings			Weights of Variables in factor		
Variable	**Factor1**	**Factor2**	**Variable**	**Factor1**	**Factor2**
ra1	-0.81	-0.54	**ra1**	0.15	0.00
ra2	0.11	0.97	**ra2**	0.00	0.33
ra3	0.87	-0.39	**ra3**	0.17	0.00
ra4	-0.83	-0.54	**ra4**	0.16	0.00
ra5	-0.13	0.99	**ra5**	0.00	0.34
ra6	0.90	-0.41	**ra6**	0.19	0.00
ra10	-0.83	-0.54	**ra10**	0.16	0.00
ra11	-0.15	0.98	**ra11**	0.00	0.33
ra12	0.90	-0.42	**ra12**	0.18	0.00

Table A7. Importance of Rural Areas – Loadings and weights of indicators (scaled to unity)

Factor #	Eigenvalue	Variance explained	Cumulative variance explained
Factor1	4.54499	0.2841	0.2841
Factor2	3.91659	0.2448	0.5288
Factor3	3.09402	0.1934	0.7222
Factor4	1.72478	0.1078	0.83
Factor5	1.16082	0.0726	0.9026
Factor6	0.60696	0.0379	0.9405
Factor7	0.42232	0.0264	0.9669
Factor8	0.26217	0.0164	0.9833
Factor9	0.11899	0.0074	0.9907
Factor10	0.08297	0.0052	0.9959
Factor11	0.03711	0.0023	0.9982
Factor12	0.02211	0.0014	0.9996
Factor13	0.00552	0.0003	1
Factor14	0.00065	0	1
Factor15	0	0	1
Factor16	0	0	1

Table A8. Socio-economic situation of rural areas – Factor Analysis results (Extraction method: Principal Component Analysis)

Factor #	Variance	Proportion	Cumulative	Weights of factors in composite
Factor1	4.14849	0.2593	0.2593	0.29
Factor2	3.52891	0.2206	0.4798	0.24
Factor3	2.92504	0.1828	0.6627	0.20
Factor4	2.15702	0.1348	0.7975	0.15
Factor5	1.68175	0.1051	0.9026	0.12

Table A9. Socio-economic situation of rural areas - Factor Analysis results (Rotated factors using varimax rotation)

Variable	Factor1	Factor2	Factor3	Factor4	Factor5
se1	0.2027	0.0242	0.2978	0.8535	0.0167
se2	0.0179	0.2723	0.4098	0.7649	0.1875
se3	0.102	0.8343	0.3396	-0.3263	0.1371
se4	-0.216	0.3577	-0.533	0.6554	-0.1144
se5	0.1033	-0.922	0.1891	-0.3009	-0.0075
se6	0.1357	-0.8606	0.2616	-0.3819	0.0224
se7	0.007	0.9851	0.0758	0.0174	0.0622
se16	0.0704	0.1127	-0.7606	-0.0893	-0.3664
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**
se17	0.0507	-0.0962	-0.8098	-0.179	0.2489
se18	-0.0757	-0.0413	0.9365	0.1478	0.1628
se22	0.6429	-0.0834	0.1432	0.0682	0.6071
se23	0.9502	-0.0347	0.0138	0.046	-0.1169
se24	0.9617	-0.0307	-0.0903	0.0124	0.1619
se25	0.9744	-0.061	-0.0201	-0.0147	-0.0727
se26	0.894	0.0251	-0.0346	0.0073	0.4171
se28	0.1331	0.1786	0.1307	0.0431	0.8942

Table A10. Socio-economic situation of rural areas - Loadings of rotated factors

Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**
se1	0.00	0.00	0.00	0.42	0.00
se2	0.00	0.00	0.00	0.34	0.00
se3	0.00	0.21	0.00	0.00	0.00
se4	0.00	0.00	0.00	0.25	0.00
se5	0.00	0.26	0.00	0.00	0.00
se6	0.00	0.23	0.00	0.00	0.00
se7	0.00	0.30	0.00	0.00	0.00
se16	0.00	0.00	0.27	0.00	0.00
se17	0.00	0.00	0.31	0.00	0.00
se18	0.00	0.00	0.42	0.00	0.00
se22	0.10	0.00	0.00	0.00	0.00
se23	0.23	0.00	0.00	0.00	0.00
se24	0.23	0.00	0.00	0.00	0.00
se25	0.24	0.00	0.00	0.00	0.00
se26	0.20	0.00	0.00	0.00	0.00
se28	0.00	0.00	0.00	0.00	1.00

Table A11. Socio-economic situation of rural areas - Weights of variables in the factors (squared loadings of rotated factors scaled to sum to unity)

Factor #	Eigenvalue	Variance explained	Cumulative variance explained
1	1.87725	0.3754	0.3754
2	1.58598	0.3172	0.6926
3	0.93305	0.1866	0.8793
4	0.48871	0.0977	0.977
5	0.11501	0.023	1

Table A12. Sectoral economic indicators – Factor Analysis results (Extraction method: Principal Component Analysis)

Factor #	Variance	Proportion	Cumulative	Weights of factors in composite
Factor1	1.87568	0.3751	0.3751	0.54
Factor2	1.58755	0.3175	0.6926	0.46

Table A13. Sectoral economic indicators – Factor Analysis results (Rotated factors using varimax rotation)

Rotated Factor Loadings			**Weights of Variables in factor**		
Variable	**Factor1**	**Factor2**	**Variable**	**Factor1**	**Factor2**
sect1	0.95	-0.08	**sect1**	0.49	0.00
sect2	0.96	0.09	**sect2**	0.51	0.00
sect27	-0.14	0.83	**sect27**	0.00	0.44
sect28	0.17	0.84	**sect28**	0.00	0.45
sect29	-0.05	0.43	**sect29**	0.00	0.12

Table A14. Sectoral economic indicators - Loadings and weights of indicators (scaled to unity)

Factor #	Eigenvalue	Variance explained	Cumulative variance explained
1	2.76482	0.2304	0.2304
2	2.34525	0.1954	0.4258
3	1.95748	0.1631	0.589
4	1.36299	0.1136	0.7025
5	0.97288	0.0811	0.7836
6	0.70038	0.0584	0.842
7	0.55298	0.0461	0.8881
8	0.47425	0.0395	0.9276
9	0.36782	0.0307	0.9582
10	0.29193	0.0243	0.9826
11	0.14978	0.0125	0.995
12	0.05943	0.005	1

Table A15. Diversification and quality of life in rural areas - Factor Analysis results (Extraction method: Principal Component Analysis)

Factor #	Variance	Proportion	Cumulative	Weights of factors in composite
Factor1	2.48496	0.2071	0.2071	0.29
Factor2	2.10722	0.1756	0.3827	0.25
Factor3	2.00192	0.1668	0.5495	0.24
Factor4	1.83643	0.153	0.7025	0.22

Table A16. Diversification and quality of life in rural areas - Factor Analysis results (Rotated factors using varimax rotation)

Rotated Factor Loadings					Weights of Variables in factor				
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Variable**	**Factor1**	**Factor2**	**Factor3**	**Factor4**
div1	0.51	-0.38	-0.17	-0.15	**div1**	0.14	0.00	0.00	0.00
div2	0.12	0.88	0.18	-0.04	**div2**	0.00	0.49	0.00	0.00
div3	0.21	0.09	0.85	0.22	**div3**	0.00	0.00	0.54	0.00
div8	-0.26	0.90	-0.10	0.00	**div8**	0.00	0.51	0.00	0.00
div9	-0.83	0.22	-0.21	0.00	**div9**	0.37	0.00	0.00	0.00
div10	0.39	0.24	0.15	0.63	**div10**	0.00	0.00	0.00	0.25
div15	-0.02	-0.05	0.13	0.80	**div15**	0.00	0.00	0.00	0.41
div16	0.43	-0.08	-0.55	0.49	**div16**	0.00	0.00	0.00	0.16
div17	0.82	0.05	-0.25	0.14	**div17**	0.36	0.00	0.00	0.00
div18	-0.31	-0.40	0.37	0.53	**div18**	0.00	0.00	0.00	0.18
div19	-0.26	-0.03	0.78	0.06	**div19**	0.00	0.00	0.46	0.00
div20	-0.49	-0.31	0.12	0.42	**div20**	0.13	0.00	0.00	0.00

Table A17. Diversification and quality of life in rural areas - Loadings and weights of indicators (scaled to unity)

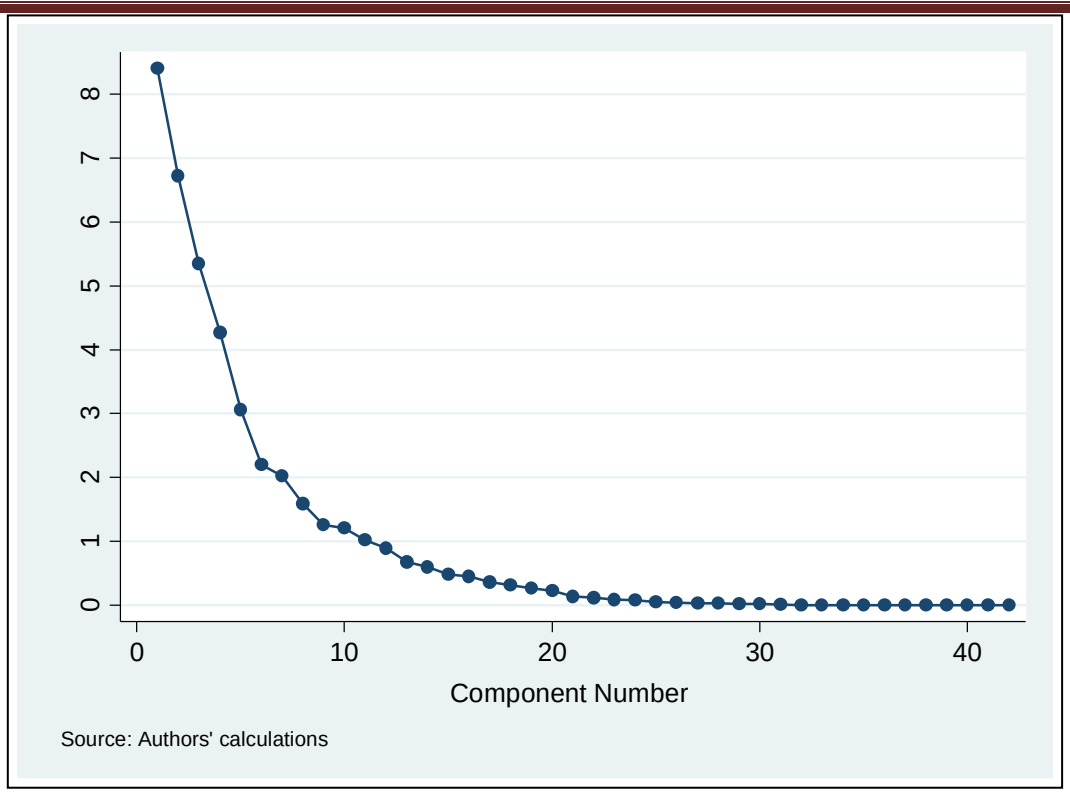

Figure A1. 'Screeplot' of the composite index of rural development

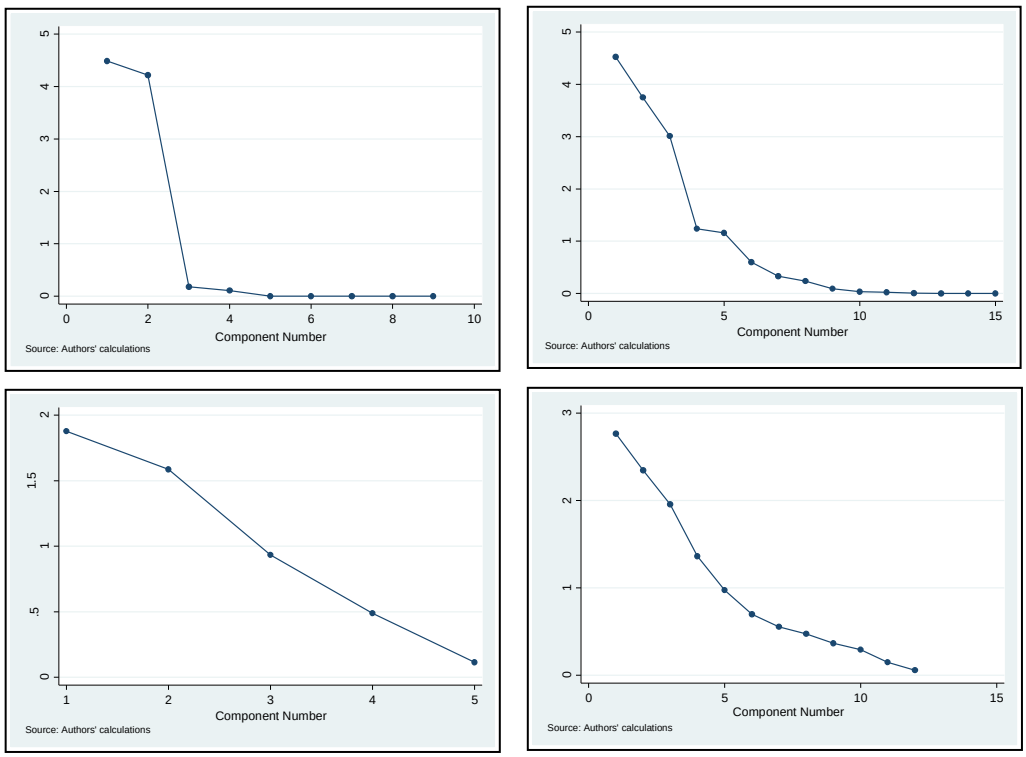

Figure A2. 'Screeplot' of composite indices of '*Importance of Rural Areas*' (top-left), '*Socio-economic situation of Rural Areas*' (top-right), '*Sectoral Economic Indicators*' (bottom-left), '*Diversification and Quality of Life in Rural Areas*' (bottom-right).