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CENTROPE Regional Development Report

Technical Report on Comparing Cross- border Regions

Peter Huber

May 2011

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Austrian Institute of Economic Research

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Abstract

Consistent with previous results, we find that CENTROPE has grown faster than could be expected from an average polycentric cross-border region in the period 2004-2008. Furthermore – also consistent with previous results – CENTROPE also in comparison to other polycentric cross-border regions is a region which is highly attractive to FDI and whose comparative advantage primarily seems to be rooted in medium skills while the share of high skilled in the population is low in CENTROPE also relative to other polycentric cross-border regions. Although regional disparities in terms of per-capita GDP are high in CENTROPE, CENTROPE is not the polycentric cross-border region with the largest internal disparities, and relative to this comparison group (and in contrast to a comparison with the EU average) the share of R&D expenditure in GDP has increased more than average in the last decade.

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CENTROPE Regional Development Report

Technical Report on Comparing Cross-Border Regions

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1. Introduction

In the course of the pilot project “CENTROPE Regional Development” a large number of analyses will be and have already been conducted, in which the economic development of CENTROPE is compared to other EU regions and even more often to the average of the EU 27. These comparisons are informative as to the level and dynamics of economic development in CENTROPE from an EU wide perspective, which may for instance be the relevant information for an entrepreneur, who is looking for an optimal location for investment, and is in general not concerned about the type of region he (or she) is investing in. For regional policy makers interested in benchmarking the progress of their region, however, this information may be too little. Here comparing cross-border regions to the “average EU regions” may generate misleading results given the particular institutional situation in cross-border regions, which are characterised by institutional differences, determined by national borders, as well as severe impediments to cross-border exchange. This therefore calls for comparing similar (in terms of institutions and resources) regions to each other.

This report first of all – based on the results of an ESPON project – suggests a set of regions that are better comparable to CENTROPE than the average EU region in terms of institutional framework conditions, and second of all explores – at the example of a limited set of indicators – how some of the findings of the previous reports in the CENTROPE regional development report project and other studies are influenced by this change of comparison group. In contrast to previous reports this report thus asks “how does CENTROPE compare to other comparable cross-border regions in the EU?” rather than “How does CENTROPE compare to the EU average?” In this sense our results are complementary to those of the remainder of the project, since they allow policy makers to assess to what degree the particular features of the region identified so far (such as the substantial internal heterogeneity and the weak linkages between the regions’ individual parts but also its rapid growth) are features that are typical to a particular kind of cross-border regions, or specific to CENTROPE even among border regions.

The next section presents the methodology on which we base our analysis and describes the set of proposed regions comparable to CENTROPE. Section 3 then describes a set of findings on the specifics of CENTROPE relative to the EU-average that have been identified in previous work and compares a set of indicators among the comparable regions identified to benchmark CENTROPE. Our primary interest here is with analysing to what degree previous results are changed by our change of reference group. Section 4 finally concludes by clarifying that the additional comparisons among cross-border regions while changing

previous results only marginally does provide additional information for policy makers in the region.

2. Deriving a group of comparison regions

2.1 Defining cross-border poly-centric urban regions in the EU 27

The starting point of our analysis is that two overriding particularities characterise CENTROPE and will shape its development path in the future. The first one is that CENTROPE is a cross-border region, the second one is that it is characterised by a number of large urban agglomerations, which by definition makes it poly-centric. Clearly, there are also other aspects which make CENTROPE unique. For instance one could argue that CENTROPE is also a region that is located at the borders between the formerly socialist economies and developed market economies that existed until the late 1980's. Indeed previous literature on border regions has sometimes built on these differences. For instance *Longhi* (2002) divides the border region of the 12 EU-member states that joined the European Union in 2004 and 2007 (the EU 12) into border regions bordering on the pre-existing EU member states (EU 15), on other EU 12 countries and on third countries.

We, however, give preference to these two features (over all thinkable other features) for a number of reasons. The first of these is that according to previous literature on the CENTROPE national differences and differences between urban centres and more rural regions have been shown to be the most relevant division lines among regions. These also predict long run developments in the region better than a simple new member state – old member state differentiation (see *Rozmahel*, 2011, *Feldkircher*, 2004, *Krajasits et al.*, 2003).

The second reason for choosing these features for defining a comparison group, is that while differences between the EU 15 and EU 12 parts of CENTROPE in terms of many indicators have been shown to diminish in the past and may thus be expected to be of lesser importance for future developments. The transnational and poly-centric nature of the region, by contrast, is likely to be an important determinant of future development of the region.

Finally, the third reason for focusing on these aspects is that from a pragmatic point of view this allows us to compare CENTROPE to a sufficiently large but handleable and well delimited set of other cross-border regions, where integration processes have been in progress for a longer time period than in CENTROPE, thus providing analysts and policy-makers with a potential for learning from other regions.

Table 1: Cross-border Metropolitan Regions

	Original Definition	Larger Poly-Centric Cross-border Regions	NUTS 2-Proxy
CENTROPE	AT112, AT122, AT125, AT126, AT127 AT130, SK010, Moson-magyarova (HU221)	AT111, AT112, AT113, AT121, AT122, AT123, AT124, AT125, AT126, AT127, AT130, CZ064, HU221, HU222, SK010, SK021	AT11, AT12, AT13, SK01, SK02, HU22, CZ06
Euregio MAHL (Aachen-Liege-Maastricht)*	DEA21, DEA25, DEA29, DEA26, NL423, BE331, BE332, BE335, BE336, BE334, BE221, BE222, BE223	BE100, BE211, BE212, BE213, BE221, BE222, BE223, BE232, BE236, BE241, BE242, BE255, BE310, BE331, BE332, BE334, BE335, BE336, BE343, BE344, BE352, DEA11, DEA12, DEA13, DEA14, DEA15, DEA16, DEA17, DEA18, DEA19, DEA1A, DEA1B, DEA1C, DEA1D, DEA1E, DEA1F, DEA21, DEA23, DEA24, DEA25, DEA26, DEA27, DEA28, DEA29, DEA2B, DEA31, DEA32, DEA34, DEA36, DEA51, DEA55, DEA56, NL221, NL224, NL225, NL226, NL310, NL327, NL332, NL333, NL334, NL335, NL336, NL411, NL412, NL413, NL414, NL421, NL422, NL423, FR413	BE10, BE21, BE22, BE 23, BE24, BE25, BE31, BE33, BE34, BE35, DEA1, DEA2, DEA3, DEA5, NL22,NL31, NL32, NL33, NL41, NL42, LU00, FR41
Luxemburg metropolitan area*	LU000, BE341, BE342, BE345, FR413, DEB21, DEB25		
Saarbrücken *	DEC01 DEC02, DEC03, DEC04, DEC05, DEC06, FR413		
Öresund metropolitan area	DK011, DK012, DK013, DK021, SE224	DK011, DK012, DK013, DK021, DK022, SE212, SE221, SE224, SE231	DK01, DK02, SE21 SE22, SE23
Lille tansborder metropolitan area	FR301, FR302, BE254, BE324, BE327	BE235, BE252, BE253, BE254, BE256, BE257, BE258, BE321, BE323, BE324, BE326, BE327, FR108, FR221, FR222, FR223, FR232, FR301, FR302	BE23, BE25, BE32 FR10, FR22, FR23, FR30
Strasbourg-Offenburg	FR421, DE134	BE341, BE342, BE345, DE134, DEB14, DEB15, DEB16, DEB19, DEB21, DEB22, DEB23, DEB24, DEB25, DEB32, DEB33, DEB36, DEB37, DEB3A, DEB3C, DEB3D, DEB3F, DEB3G, DEB3H, DEB3K, DEC01, DEC02, DEC03, DEC04, DEC05, DEC06, FR411, FR412, FR413, FR414, FR421,	BE34, DE13, DEB1, DEB2; DEB3, DEC0, FR41, FR42
Silesian-Moravian polycentric metropolitan area	PL225, PL22A PL22C, PL227, CZ080	CZ071, CZ072, CZ080, PL216, PL225, PL227, PL228, PL229, PL22A, PL22B, PL22C, PL522, SK031	CZ07, CZ08, PL21, PL22, PL52, SK03
Nice-Monaco-Sanremo	FR823, ITC31	FR821, FR823, FR825, ITC16, ITC31, ITC32	FR82, ITC1, ITC3

Source: Chilla et al (2010) own calculations. Note: Excluded Basel Geneve because not all of the regions belong to the EU, and Twente-Nordhorn and Arnhem Nijmegen because of lacking metropolitan dimension.

Given one accepts the transnational and poly-centric nature of CENTROPE as its central defining criterium, a natural starting point for developing a typology of border regions is the

ESPON study on urban functions (see *IGEAT*, 2007). This study identified 28 cross-border regions of which 15 were defined as being metropolitan. Based on this study a further ESPON Study (METROBORDER – *Chilla et al.*, 2010) which takes into account the additional criterium of poly-centricity isolates 11 cross-border metropolitan regions in Europe, from which we delete the regions of Geneve and Basel since we want to focus on cross-border regions that are entirely located on the territory of the EU 27.¹ In consequence we end up with 8 cross-border metropolitan regions (excluding CENTROPE) that we propose to use as a comparison group for the CENTROPE.

The original NUTS 3 proxy definitions proposed in the ESPON study on urban functions for these regions are shown in the first column of table 1. As can be seen from this table there are a number of drawbacks to this delineation of cross-border metropolitan areas. First, and probably most importantly the definition of the Vienna-Bratislava metropolitan area (as the region is named in the study) does not include all the regions that together form the CENTROPE, with South Moravia, parts of Lower Austria and Burgenland, Vas and also parts of Győr-Moson-Sopron as well as Trnava region missing. The reason for this is that the typology uses contingent spaces with a sufficiently large population density to define metropolitan areas.

While this is a methodologically sound way to define poly-centric cross-border regions from the point of view of economic geography, from a practical point of view this leads to a situation where only some of the regions that are currently involved in cross-border policy making in the CENTROPE will be covered by the analysis. Policy makers may thus well argue that an analysis based on the cross-border regions as defined by *Chilla et al.* (2010) is irrelevant for the “space of action” for which they intend to design policies.

We therefore augment the typology provided by *Chilla et al.* (2010) by a further typology that is based on a larger regional division of cross-border metropolitan regions. To develop this we follow a very simple two step procedure, in which – in the first step – we add to the definition of the Vienna-Bratislava region as defined in *Chilla et al.* (2010) all regions that are members of CENTROPE (i.e. South Moravia, parts of Lower Austria and Burgenland, Vas and Trnava). In a second step we then measure the maximum distance from the centre of the CENTROPE (which we assume to be located half way between Bratislava and Vienna) to the borders of CENTROPE. We use this radius to draw circles of equal radius around the geographic centres of the cross-border regions as defined by *Chilla et al.* (2010) to derive cross-border regions that are of a similar size in terms of area as the CENTROPE. We refer to these regions as larger poly-centric cross-border regions.

¹ This is because on the one hand EU-internal borders are likely to have a different impact on regional development than external borders and because on the other hand we do not want to additionally complicate the already difficult data situation.

Although this is a relatively simple procedure, in this way we are able to derive a set of cross-border regions that have a polycentric region in their centre and are of an about equal size as CENTROPE. None the less some challenges arise. In particular the regions of Saarbrücken, Strassburg-Offenburg and the Luxemburg metropolitan area are located so close to each other that they would cover almost identical territories if they were considered separate regions in this typology. We therefore decided to merge these regions into one large polycentric cross-border region. Thus by focusing on larger polycentric cross-border regions we end up with 6 regions (excluding CENTROPE), to which CENTROPE can be compared. The NUTS 3 regions belonging to these larger poly-centric cross-border regions are listed in the second column of table 1.

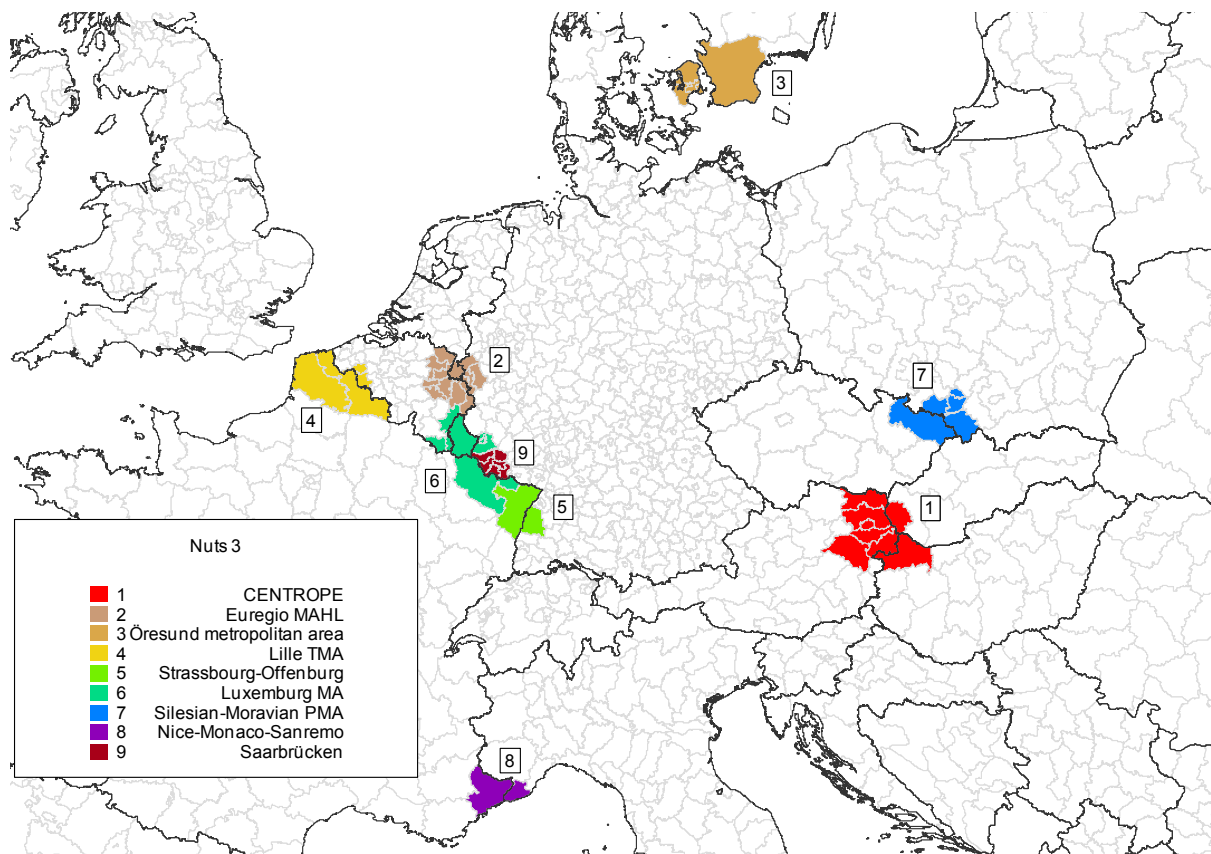
A second problem arising from the original *Chilla et al.* (2010) definition, which is particularly impractical from the point of view of data availability, is that the regional proxies for individual cross-border regions are given on a NUTS 3 level only (see Huber, 2011). However a number of important data at the European level are available on a NUTS 2 level only. Thus to make available a larger set of indicators by which regions are comparable, we would also like to have a proxy definition of cross-border metropolitan areas on a NUTS 2 level. As an alternative to the NUTS 3 level proxy definition of poly-centric cross-border regions in the EU, we therefore also use an alternative definition based on a NUTS 2 level, which includes all NUTS 2 level regions that are touched by one of the cross-border regions. This alternative definition of cross-border metropolitan regions is shown in the last column of table 1.

2.2 Characteristics of cross-border metropolitan regions

In sum therefore we end up with three definitions of EU 27 regions to which CENTROPE can be compared. The first of these are the original poly-centric cross-border regions derived by *Chilla et al.* (2010) which are shown in Map 1 and whose population, area and population density is displayed in Figure 1. As can be seen from the map most of the cross-border polycentric regions in the EU 27 as defined by *Chilla et al.* (2010) are located at the German border to France or Belgium or at the French-Belgian border. They are thus located very close to or directly in what has often been referred to as the economic core of the EU, and represent regions of some of the richest territories of the EU. CENTROPE together with the Öresund region and with the Moravian-Silesian cross-border region is an exception to this. In addition a feature that puts CENTROPE apart from other poly-centric cross-border regions, aside from the Luxemburg metropolitan area is that it encompasses three different countries, rather than two as most other poly-centric cross-border regions. This may be important

because it suggests that issues of cross-border policy co-ordination may be even more difficult than in other comparable regions from a political economy point of view.²

Map 1: Location of original cross-border poly-centric regions in the EU



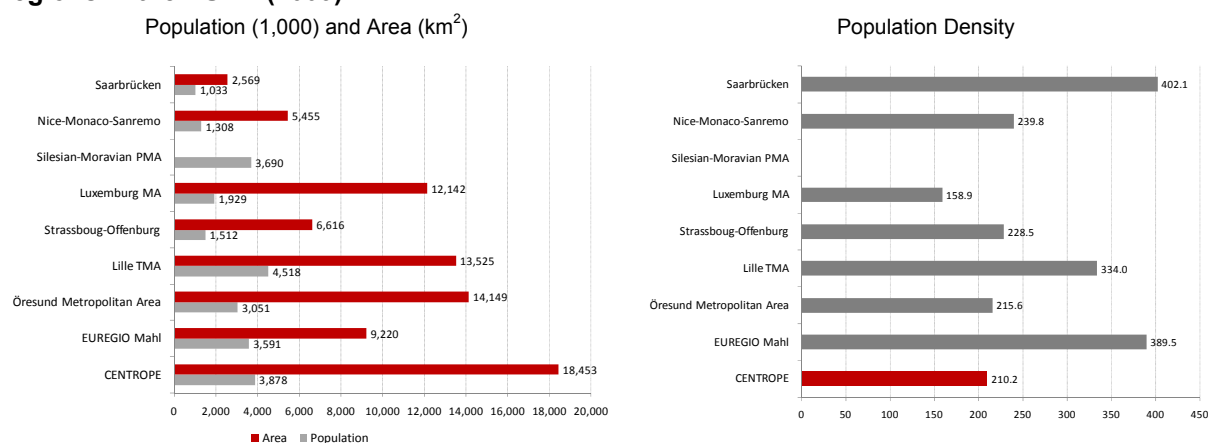
SOURCE: *Chilla et al.* (2010).

Furthermore, the original *Chilla et al.* (2010) typology leads to a rather heterogeneous set of regions in terms of both area and population. In particular according to this definition CENTROPE is the largest among the 9 poly-centric cross-border regions defined by *Chilla et al.* (2010) with a territory of about 18.500 square kilometers, while the Saarbrücken area as the smallest poly-centric cross-border metropolitan area covers a territory of only about 2.500 square kilometers. Similarly, the population of these 9 regions ranges from 4.5 million inhabitants in the Lille metropolitan area to just over 1 million inhabitants in Saarbrücken, with the CENTROPE ranking as the second most populous poly-centric cross-border region. These differences in terms of population and area also lead to rather different outcomes among regions in terms of population density. Here the population density ranges from 402.1

² Note that this applies also to the larger poly-centric cross-border regions described below. Here CENTROPE is the only region that encompasses four countries.

inhabitants per square kilometer in the Saarbrücken area to 158.9 inhabitants per Square kilometer in the Luxemburg Metropolitan area. CENTROPE, with a population density of 210.2 inhabitants per square kilometer ranks second to last.

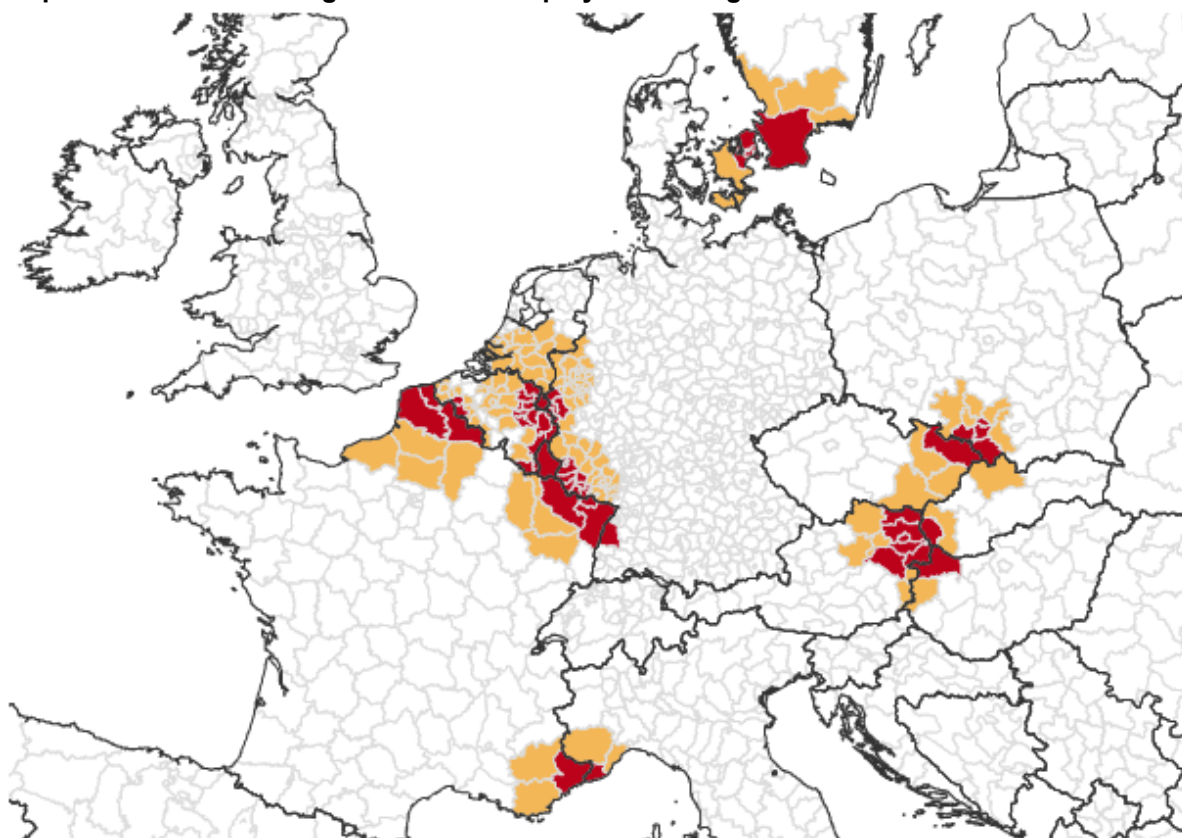
Figure 1: Area Population and Population Density of original cross-border poly-centric regions in the EU 27 (2009)



SOURCE: Eurostat, own calculations, Note: Population data on NUTS 3 regions of the Silesian – Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

The second definition of comparable regions to CENTROPE are the larger cross-border poly-centric regions, which we have defined in such a way as to represent regions that are of an about similar area as the CENTROPE region. As can be seen from Map 2, where the regions added to the respective cross-border region are shaded in a lighter color enlarging the definition results in a relatively large addition of territory to the respective regions. However, as can be seen from Figure 3 redefining the regions in this way, due to the method chosen the set of comparison regions is much less heterogeneous in terms of area, with all of the regions except Nice-Monaco-Sanremo (on account of being located close to the sea) covering between 38.800 square kilometers (for the Öresund Metropolitan area) to 50.200 square kilometers (for the Luxemburg metropolitan area).

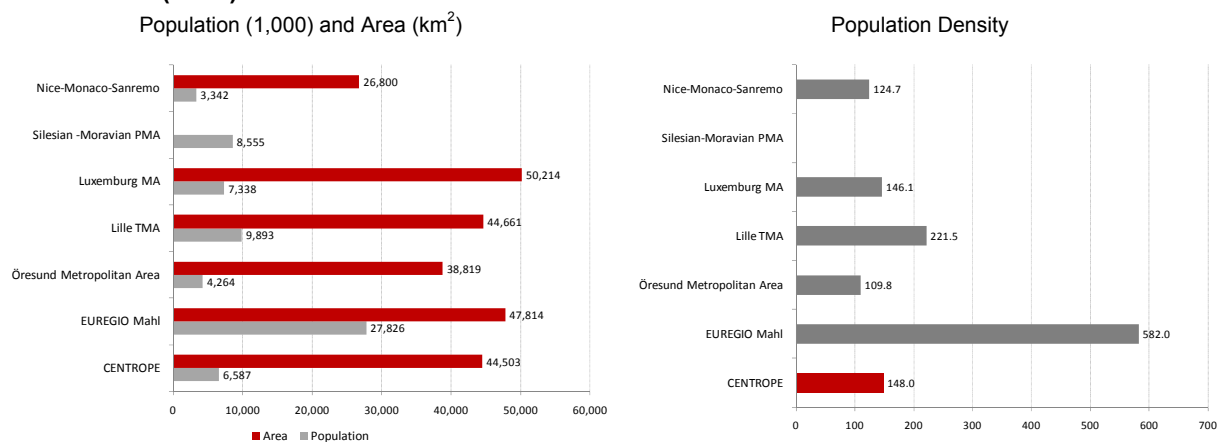
Map 2: Location of larger cross-border poly-centric regions in the EU



SOURCE: Chilla et al. (2010), own calculations.

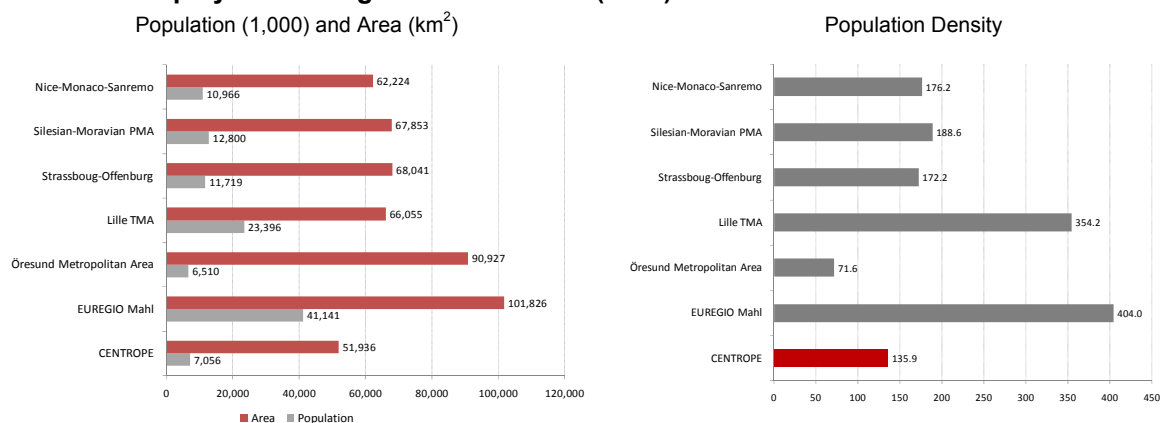
Redefining cross-border poly-centric regions in this way, however, does not lead to a more homogenous set of regions in terms of population and population density on account of the many high population density Nuts 3 regions that are added to the Euregio MAHL. This leads to an increase of the population of this region from originally slightly below 3.6 million inhabitants to over 27.8 million inhabitants (i.e. an increase by a factor of almost 8) while other regions such as the Nice-Monaco-Sanremo region – as the smallest region in terms of population – increase their population by a factor of 3. Aside from these two outliers, however, the population of these regions ranges between 4.3 million (Öresund) and 9.9 million (Lille transborder metropolitan area) with CENTROPE (with a population of 6.6 million inhabitants) ranking slightly below average on 5th place.

Figure 2: Area Population and Population Density of larger cross-border poly-centric regions in the EU 27 (2009)



SOURCE: Eurostat, own calculations. Note: Population data on NUTS 3 regions of the Silesian-Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

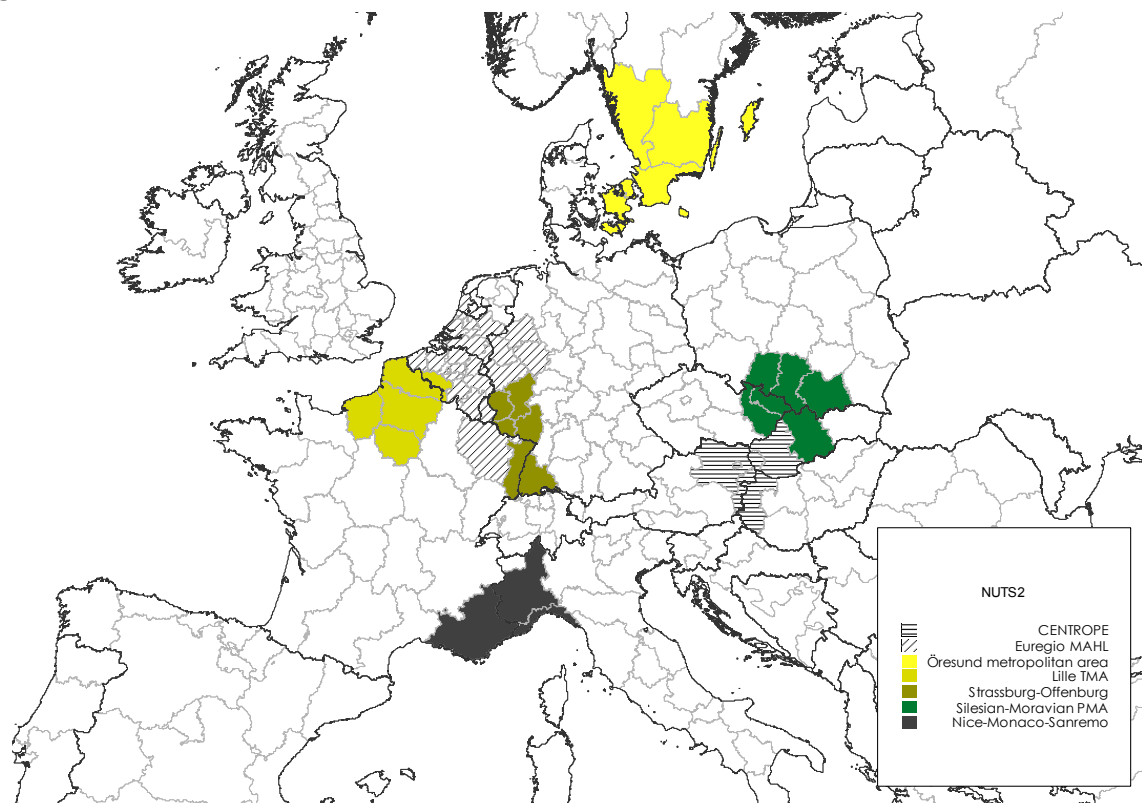
Figure 3: Area Population and Population Density of NUTS 2 level proxy regions of larger cross-border poly-centric regions in the EU 27 (2009)



Source: Eurostat, own calculations.

Furthermore, the rather homogenous area combined with rather large differences in population also lead to a strong heterogeneity of the 7 larger cross-border metropolitan areas in terms of population density. Unsurprisingly also in terms of this criterium the Euregio MAHL (with a population density of 582.0 inhabitants per square kilometre) leads the group of poly-centric cross-border regions, while the Öresund region has the lowest population density (of 109.8 inhabitants per square kilometre) and CENTROPE is located in the middle (3rd rank) with 148 inhabitants per square kilometre.

Map 3: Location of NUTS 2 level proxy regions of cross-border poly-centric regions in the EU



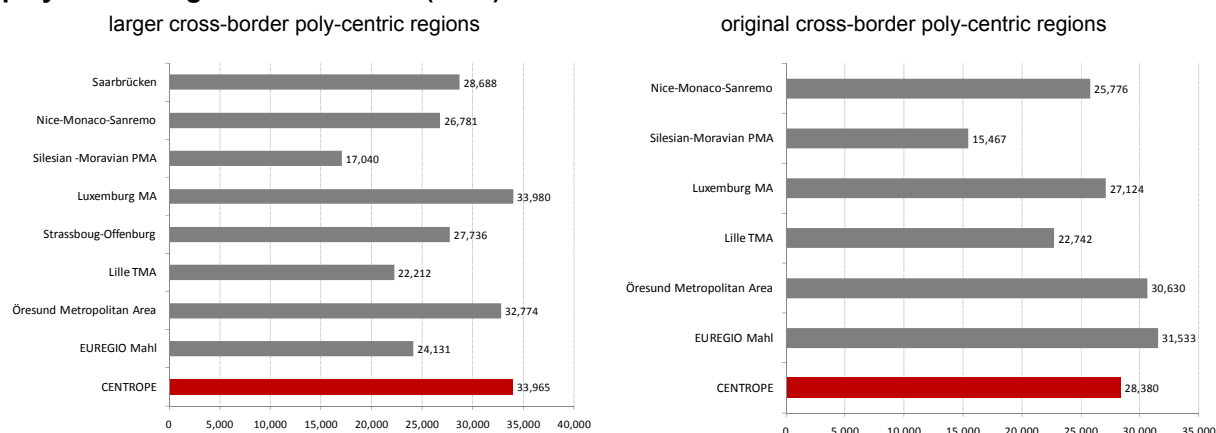
Source: Chilla et al. (2010).

Finally, our third, and least preferred, definition of poly-centric cross-border regions is the NUTS 2 level proxy definition, which we use solely to overcome the data constraints inherent in our attempted comparison. As can be seen from map 3 and figure 3 this definition results a definition of urban territories that include very large regions indeed, with the population of these regions reaching up to over 40 Million in the case of Euregio MAHL and population density ranging between 71.6 inhabitants per square kilometre and 404 inhabitants per square kilometre.

3. Comparing CENTROPE to poly-centric cross-border regions in the EU

In sum, therefore, all three of our definitions of poly-centric cross-border regions suggest that while these regions may be a good comparison group in terms of both the functional specialisation of a region as well as the institutional framework conditions, they are also rather heterogeneous in terms of most other indicators. Our aim in this report is, however, to determine to what degree some of the features of CENTROPE highlighted in previous studies on these region, are a feature particular to the CENTROPE or general to other cross-border metropolitan regions.

Figure 4: GDP per capita at purchasing power parities of original and larger cross-border poly-centric regions in the EU 27 (2008)

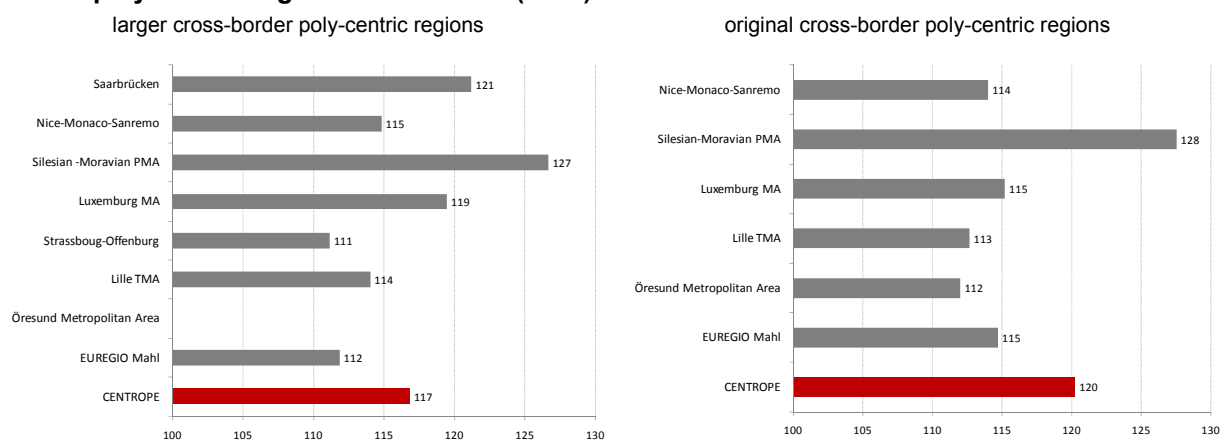


Source: Eurostat, own calculations, Note: Population data on NUTS 3 regions of the Silesian – Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

3.1 GDP per capita and GDP per capita growth in the CENTROPE in comparison of poly-centric cross-border regions

Thus in this section we focus on one of the results that has been highlighted by almost every study written on the CENTROPE in the last decade (see *Krajasits et al., 2003, Palme and Feldkircher, 2003, Rozmahel 2011*). This is that the CENTROPE has an above EU average GDP per capita on account of a high degree of urbanisation, and a more rapid growth than the EU average on account of a rapidly growing part in the new member state parts of the region. This thus suggests comparing GDP per capita at purchasing power parities in levels and growth rates to other poly-centric cross-border regions, to determine if these stylized facts also hold in terms of a comparison with these regions.

Figure 5: Growth of GDP per capita at purchasing power parities of original and larger cross-border poly-centric regions in the EU 27 (2008)



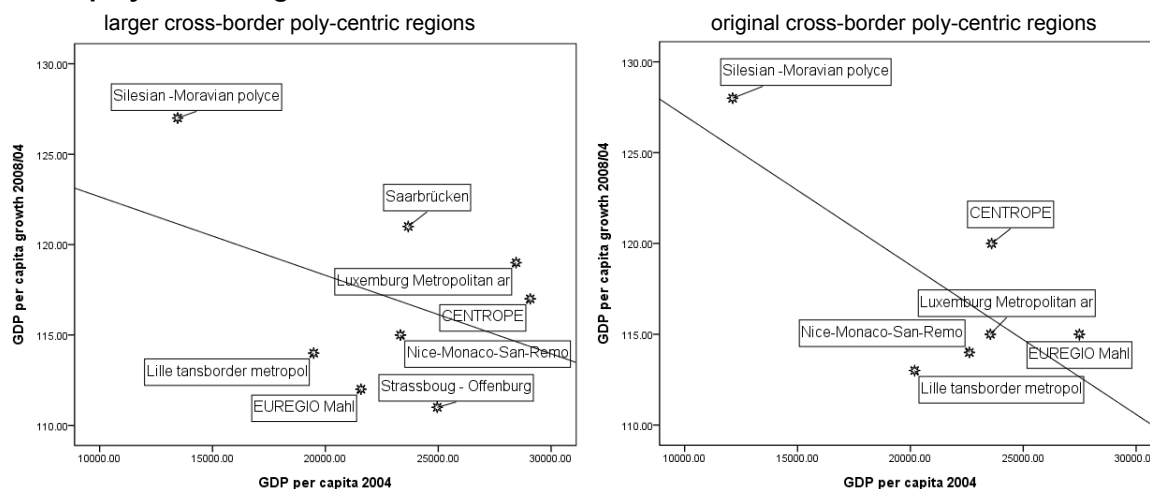
Source: Eurostat, own calculations, Note: Population data on NUTS 3 regions of the Silesian – Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

As can be seen from figures 4 and 5 in terms of GDP per capita at purchasing power parities CENTROPE is a region with clearly above average GDP per capita levels and growth rates also among the European cross-border regions of the EU irrespective of whether we base this comparison on the definition of the original cross-border poly-centric regions, or whether we consider the larger cross-border poly-centric regions.

Among the former the CENTROPE was the cross-border poly-centric region with the second highest GDP per capita level (after the Luxemburg metropolitan region) in 2008 and the fourth largest GDP per capita growth rate in the period from 2004 to 2008 among all 9 poly-centric cross-border regions considered. Thus in this narrow definition mainly regions with a substantially lower GDP per capita level than that of CENTROPE (such as the Silesian-Moravian polycentric metropolitan area Euregio MAHL and Lille Transborder Region) are growing more rapidly than CENTROPE. This therefore suggests that as among all regions of the European Union (see *Huber and Tondl, 2011* for recent evidence) also among (but not necessarily within – see *Decoville et al, 2010*) the poly-centric cross-border regions a convergence process is taking place, by which initially poorer regions are also growing more rapidly.

The same process applies among the larger cross-border poly-centric regions. Although here CENTROPE had the third highest GDP per capita among 7 regions in 2008 but experienced the second highest growth rate, also here initially richer regions such as the Euregio MAHL region growing more slowly, while poorer regions such as the Silesian-Moravian poly-centric metropolitan area seem to be growing more rapidly.

Figure 6: Growth of GDP per capita at purchasing power parities of original and larger cross-border poly-centric regions in the EU 27



Source: Eurostat, own calculations, Note: Population data on NUTS 3 regions of the Silesian – Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

In Figure 6 we therefore plot the GDP growth rate of the poly-centric cross-border regions in the time period from 2004 to 2008 against the GDP per capita at purchasing power of these regions in 2001. As can be seen from this plot the CENTROPE in both versions of the typology is located above the regression line between these two variables (which is marked by the negatively sloped line running through the diagram). This therefore suggests that relative to its initial GDP per capita level CENTROPE has been growing more rapidly than could be expected from an average poly-centric cross-border region in the EU 27.

3.2 Development and level of internal disparities in the CENTROPE in comparison of poly-centric cross-border regions

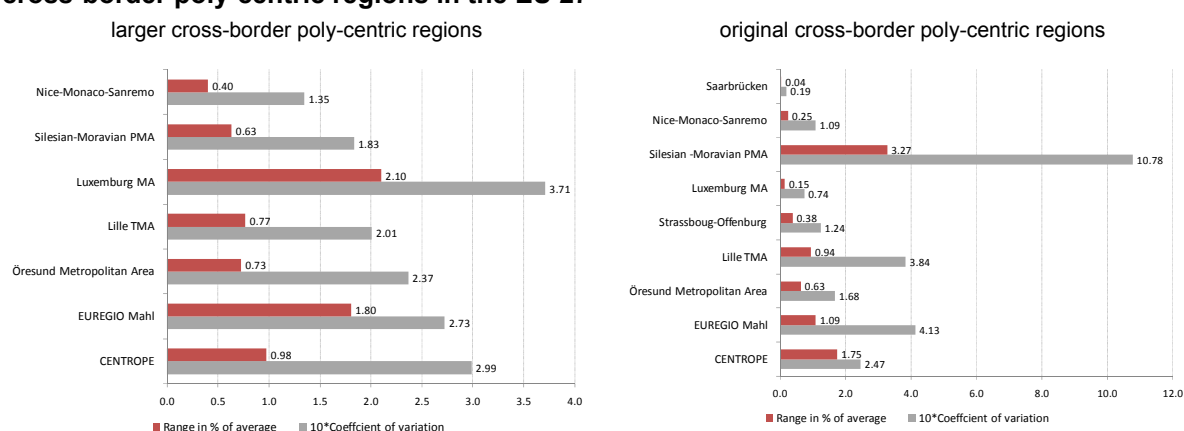
A further stylized fact that has been stressed in a number of studies (e.g. *Huber and Mayerhofer, 2003, Krajasits, 2003*) are the huge internal regional disparities in terms of GDP per capita and also in the labour market situation among individual CENTROPE regions, that have, however, diminished in the last years. In Figure 7 we therefore plot two measures of the size of internal disparities for each of the original and larger cross-border poly-centric regions in the EU 27. The first of these measures is the coefficient of variation of the respective indicator. This variable is defined as the standard deviation of a certain indicator over the regions of particular territory as a share of the mean of this indicator for this territory.³ The second of these is the range of the indicator, which is defined as the difference

³ Note that in Figure 7 this indicator has been multiplied by 10 to insure a scale as the range.

between the maximum and the minimum value of the respective indicator in the subregions of our comparison regions relative to its average.

The difference between these two indicators of regional disparities within a territory is in the way they treat outliers and in their sensitivity towards the number of regions considered. In particular the coefficient of variation is less sensitive to outliers but reacts sensitively to the number of regions included in the comparison. The range by contrast is very sensitive to outliers but less sensitive to the number of regions included in constructing this indicator.

Figure 7: Coefficient of variation and range of GDP per capita at PPS in original and larger cross-border poly-centric regions in the EU 27



Source: Eurostat, own calculations, Note: Population data on NUTS 3 regions of the Silesian – Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

As can be seen from figure 7, although results for this indicator are highly sensitive to the definition of cross-border regions, according to both measures of regional disparities in both definitions of poly-centric cross-border regions, CENTROPE is not the region with the largest regional disparities. When considering the original definition of cross-border polycentric areas in Europe for instance the coefficient of variation in GDP per capita is slightly higher than in CENTROPE in 3 out of 9 cross-border regions, while the range is the second highest among these 9 regions. Similarly, when considering the 7 larger polycentric cross-border regions CENTROPE ranks second in terms of the coefficient of variation and third in terms of the range of GDP per capita.

Thus while CENTROPE is a poly-centric cross-border region with large internal disparities a comparison to other such regions in the EU 27 suggests that it is not the poly-centric cross-border region with the largest internal disparities. Indeed these regions – in particular when focusing of the larger poly-centric cross-border regions – typically have large disparities,

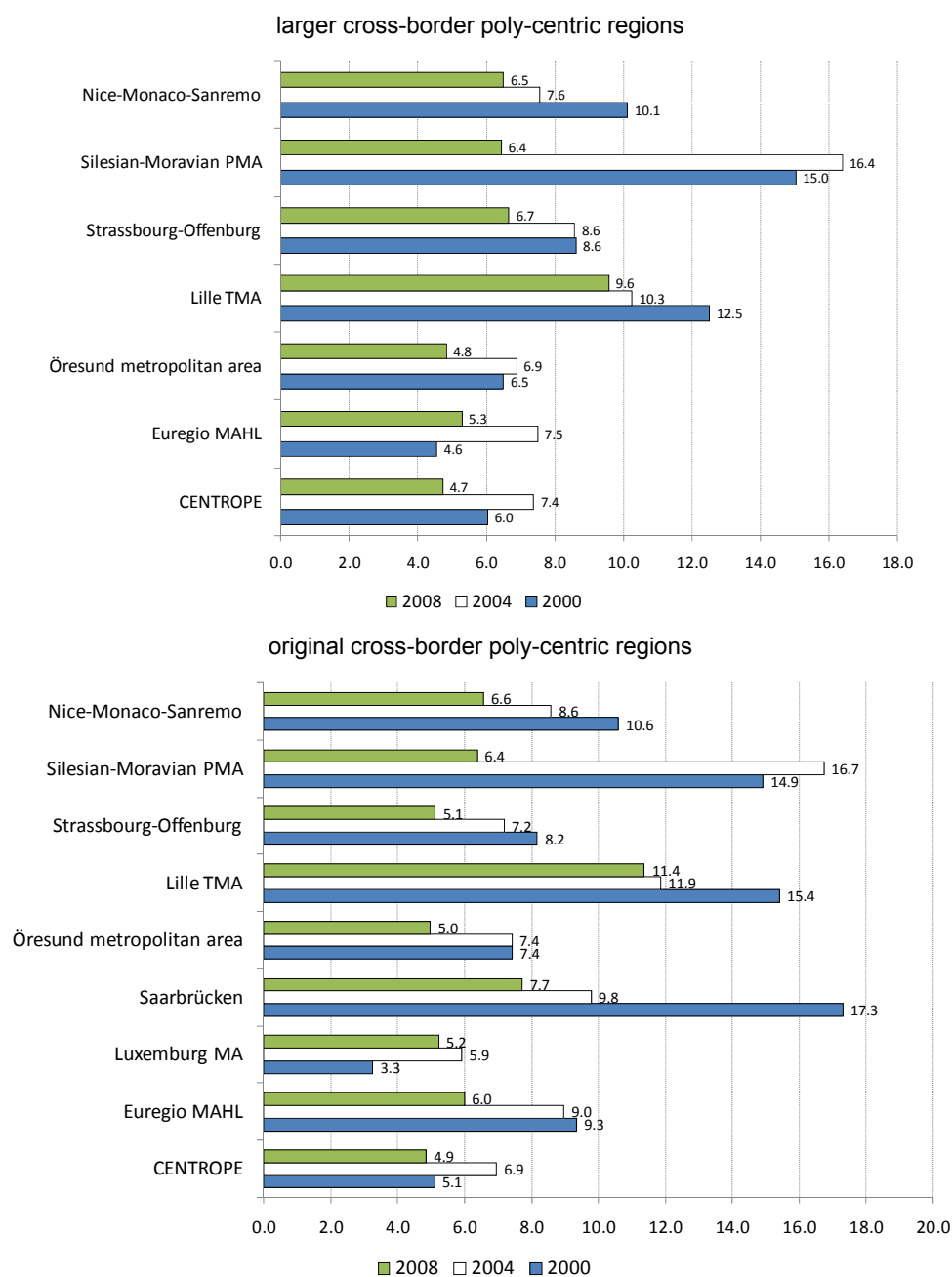
since many of them, aside from covering rich urban centers also often encompass more rural or suburban regions.

3.3 Unemployment rates in the CENTROPE in comparison of poly-centric cross-border regions

In addition a number of recent studies (e.g. *Rozmahel et al.*, 2011) have also found that CENTROPE is a region with a relatively favourable labour market situation when compared to the European Union average. When comparing the unemployment rate in the CENTROPE to the 6 larger poly-centric urban regions (see Figure 8), we find that this has also been true relative to other poly-centric cross-border regions at all points in time in the last decade. Indeed the relative labour market situation of the CENTROPE seems to have improved slightly in the last 5 years. While in 2000 CENTROPE was the region with the second lowest unemployment rate among the 7 larger poly-centric cross-border regions in the EU 27 (behind Euregio MAHL), in 2009 CENTROPE had the lowest unemployment rate among the comparable larger poly-centric cross-border regions. Similar observations apply to the 9 original poly-centric cross-border regions in the EU. Here CENTROPE also had the second lowest unemployment rate among these regions (behind the Luxemburg Metropolitan area) in 2004, but the lowest one in 2009.

Thus with respect to the labour market situation our evidence suggests even an improvement in the labour market situation of CENTROPE when comparing to the set of poly-centric cross-border regions of the EU 27, which are often located in the low or at least medium unemployment countries of the EU.

Figure 8: Unemployment rate in original and larger cross-border poly-centric regions in the EU 27

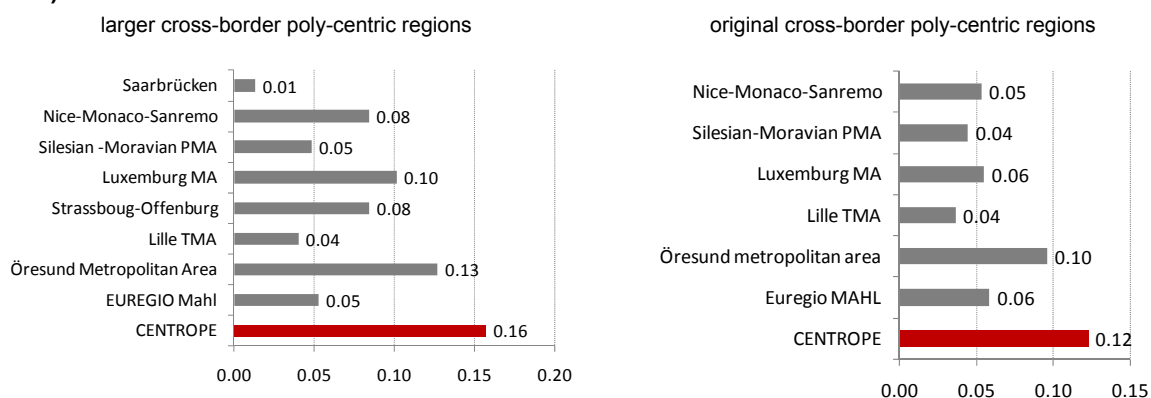


Source: Eurostat, own calculations, Note: Population data on NUTS 3 regions of the Silesian – Moravian polycentric metropolitan area missing on account of missing polish population data on NUTS 3 level.

3.4 High FDI's to the CENTROPE

A recent study (*Römisch et al., 2011*) has also pointed out that CENTROPE is one of the top locations for foreign direct investments in the EU 27. Both when comparing CENTROPE to the EU NUTS 2 as well as to the NUTS 3 level regions of the EU, many of CENTROPE's regions rank among the top regions with respect to the number of inward FDI's per 1000 inhabitants received in the time period from January 2003 to March 2010. Once more this stylised fact also carries through to the comparison with the cross-border poly-centric regions of the EU. Both when considering the 7 larger as well as when considering the 9 smaller poly-centric cross-border regions of the EU 27, CENTROPE is the region which has received the largest share of FDI per 1000 inhabitants. When considering the larger poly-centric cross-border regions only the Öresund metropolitan area attains a level of inward FDI comparable to that of CENTROPE, while when considering the 9 original poly-centric cross-border regions also the Luxemburg Metropolitan area has a rather high share. All other poly-centric cross-border regions have received half as many or less FDI's per 1000 inhabitants than CENTROPE in the time period from January 2003 to March 2010.

Figure 9: Foreign Direct Investments (Projects per 1.000 Inhabitants, January 2003 to March 2010)



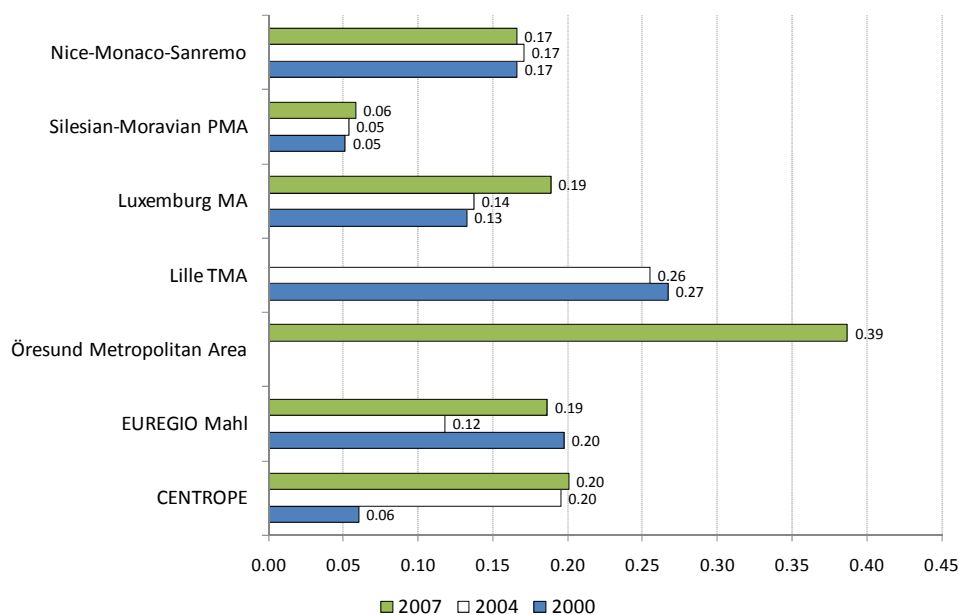
Source: www.fdimarkets.com, own calculations.

3.5 Indicators on human capital, innovation and regional specialisation in CENTROPE in comparison

Finally, however, a number of studies have also criticised CENTROPE on account of certain weaknesses in terms of R&D expenditure and patenting activities, but also on account of a rather low share of highly (tertiary) educated persons in its work-force. These studies in general have concluded that the comparative advantage of the CENTROPE is a high share of a well-educated workforce with an intermediary (ISCED 3 or 4) education (see e.g. Rozmahel et al, 2011).

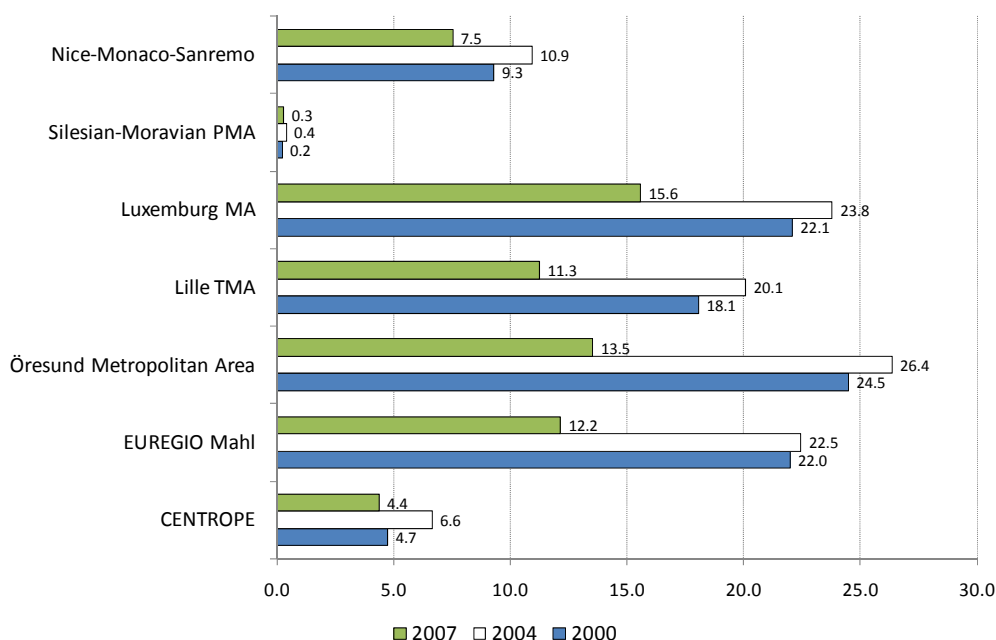
Although here, due to lacking data on a NUTS 3 level we can conduct a comparison to other poly-centric cross-border regions only on the basis of NUTS 2 proxy regions the data reported in Figure 11 and 12 suggest that while CENTROPE was consistently (over all years considered in these figures) the poly-centric cross-border region with the second lowest number of patents per 1000 inhabitant, with only the Silesian-Moravian polycentric metropolitan area performing poorer, a slight improvement with respect to R&D expenditures can be registered in the last years. In terms of this indicator CENTROPE starting from a value that was comparable to the Silesian-Moravian polycentric metropolitan area in 2000 has improved its rank to the regions with the third highest (after Öresund Metropolitan Area and the Lille transborder metropolitan area) R&D Expenditure in % of GDP among the poly-centric cross-border regions in the EU.

Figure 10: Research and Development Expenditure as a share of GDP in NUTS 2 proxy poly-centric cross-border regions in the EU



Source: Eurostat, own calculations,

Figure 11: Patents per 1000 inhabitants in NUTS 2 proxy poly-centric cross-border regions in the EU

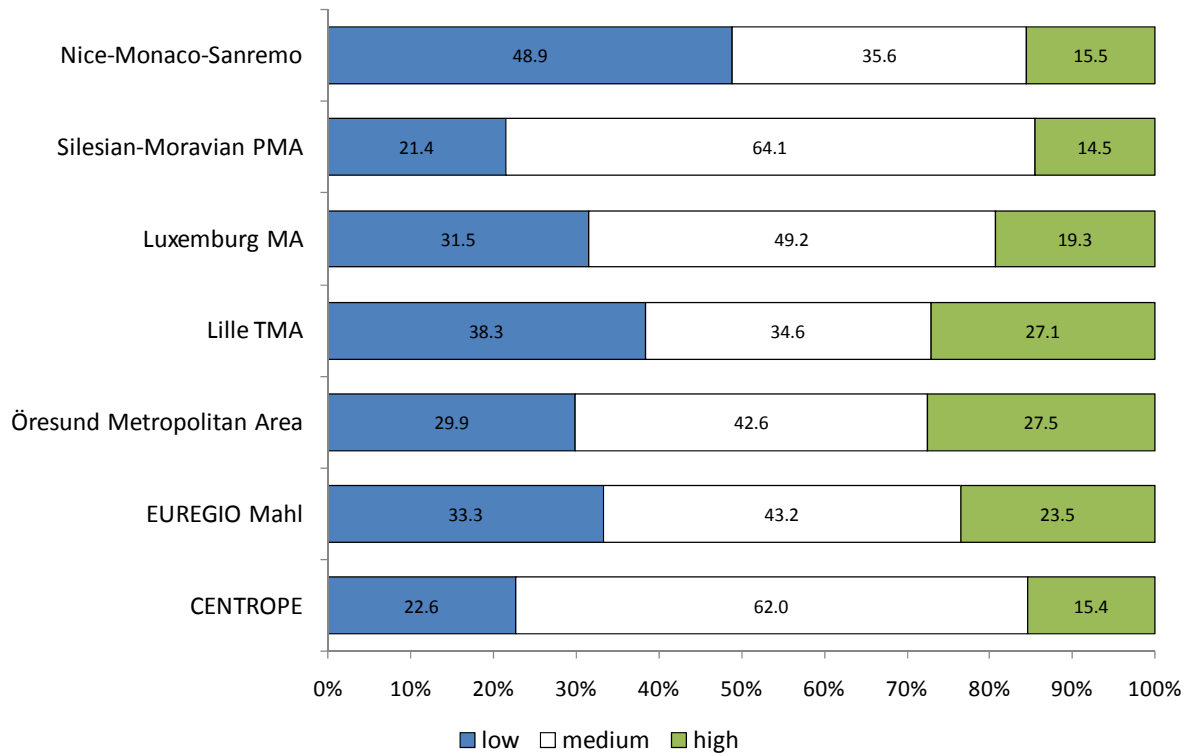


Source: Eurostat, own calculations.

In terms of the education structure, by contrast, many of the features observed by previous studies when comparing CENTROPE to the EU persist. In particular CENTROPE (behind the Silesian-Moravian poly-centric metropolitan area) is the region with second lowest share of tertiary (ISCED 5 or more) educated persons in its population, but (also after the Silesian-Moravian poly-centric metropolitan area) has the second lowest share of persons with only a completed compulsory education (ISCED 2 or lower) in its population among all poly-centric cross-border regions in the EU 27.

Given this low share of tertiary but also compulsory educated population it is no surprise that CENTROPE also ranks second (again behind the Silesian-Moravian poly-centric metropolitan area) in terms of the share of persons with intermediary (ISCED 3 or 4) education among the poly-centric cross-border regions in the EU.

Figure 12: Population Share by Educational attainment in NUTS 2 proxy poly-centric cross-border regions in the EU



Source: Eurostat, own calculations.

4. Conclusions

This study has proposed a set of cross-border regions that in terms of institutional features and urbanisation can be considered comparable to CENTROPE. Furthermore, it has considered whether a set of findings derived from studies comparing CENTROPE to the EU average are robust to this change of comparison group. We find that, as with previous results, CENTROPE also in comparison to other poly-centric cross-border regions in the EU is a region with high growth and high GDP. In particular relative to its GDP per capita CENTROPE has grown faster than could be expected from an average poly-centric cross-border region in the period 2004 to 2008. Furthermore – also consistent with previous results – CENTROPE also in comparison to other poly-centric cross-border regions is a region which is highly attractive to FDI and whose comparative advantage primarily seems to be rooted in medium skills while the share of high-skilled in the population is low in CENTROPE also relative to other poly-centric cross-border regions.

We, however, also find that although regional disparities in terms of GDP per capita are high in CENTROPE, CENTROPE is not the poly-centric cross-border region with the largest internal disparities, and that relative to this comparison groups (and in contrast to a comparison with the EU average) the share of R&D expenditure in GDP has increased more than average in the last decade.

In general our results thus suggest that a comparison of CENTROPE to other poly-centric cross-border regions in other respects, while unlikely to change the “big picture” of the region derived in previous studies, can provide additional information on the relative comparative advantage and development of the region. We therefore propose that comparisons based on our reference set of regions should be included wherever possible in future research on CENTROPE.

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