



MORAVIAN GEOGRAPHICAL REPORTS

Czech Academy of Sciences, Institute of Geonics
Palacký University Olomouc, Faculty of Science

journal homepage: www.geonika.cz/mgr.html

doi: <https://doi.org/10.2478/mgr-2025-0018>



Labels of regional integration: The case of naming in polycentric urban regions

Donata Wysocka-Niemiec ^{a,*} , Ben Derudder ^{b,c,d} , Jadwiga Biegańska ^d 

Abstract

A main challenge in the planning and management of polycentric urban regions (PUR) is achieving functional coherence between their main centers. In this study, we approach the region's name as an implicit indicator of such integration and examine the factors that shape the naming of PURs. Analyzing 312 PURs worldwide, we explore the relationships between naming – expansion, merger, new name – and a range of settlement-urbanization, geographical, socio-demographic, and economic variables. Our findings demonstrate that regions within each naming category exhibit their own unique set of characteristics. We argue that this differentiation reflects different governance arrangements, cooperation mechanisms, and development aspirations, making the name a potential tool in the hands of regional authorities to help shape the coherence of PURs.

Keywords: Polycentric urban regions, place names, toponymy

Article history: Received 16 March 2025, Accepted 19 November 2025, Published 31 December 2025

1. Introduction

Urban planning and urban development models have shifted from approaches based on single concentrated centers to more complex and dispersed spatial models (Meijers & Burger, 2010). Champion (2001, p. 664) distinguished between three main modes of dispersion: centrifugal, incorporation, and fusion. Despite significant differences between these modes, they can each be at the root of the formation of polycentric urban regions (PURs): regions “with multiple, relatively proximate centers, where development across these centers is mutually beneficial and balanced” (Harrison et al., 2022, p. 3). Alongside this morphological definition of PURs, researchers have also pointed to functional elements, to centers showing “significant functional interconnection and complementarity” (Davoudi, 2007, p. 11). PUR-formation in a functional guise is a process: there is no clear end-state, but there is a sense that the sum (the region) becomes increasingly prominent in relation to its parts (its cities). It is functional integration that is considered a key condition enabling PURs to achieve agglomeration effects comparable to those generated by large, consolidated metropolitan centers (Wang et al., 2019). However, this functional integration is neither given nor obvious. As Meijers (2008) has put it: “summing small cities does not make a large city”, pointing to morphological PURs often lacking internal cohesion and, therefore, remaining fragmented in functional terms (Cardoso & Meijers, 2017). This paper deals with a specific dimension of (the representation of) the functional integration of PURs: their naming.

One of the ways in which morphological PURs are being integrated, or through which other forms of integration become legible, is the way in which they are labelled. Having, devising, or advocating for a name that binds together the different parts of a PUR captures the desire for and/or unfolding of regional integration. This can be a complex process involving the development of a shared vision for the future, common goals, and constructing a regional identity. Still, it can also be a more organic process where societal, cultural and economic factors go in the direction of regional integration. Since names are rarely ‘accidental’, they can also reflect a region's characteristics: its spatial structure, territorial conditions, and internal differentiation resulting from the roles and significance of its constituent centers.

In this context, it is important to better understand the factors underlying PUR names. Our analysis builds on the three naming strategies identified by Cardoso and Meijers (2017) – expansion, merger, and new name – and seeks to uncover the conditions under which each strategy is adopted. Specifically, we examine how these naming strategies relate to a set of structural, spatial, and socio-economic characteristics of PURs and their constituent cities. Our selection of variables is guided by the premise that naming is not a neutral or arbitrary act, but one that may reflect and reinforce how a region is structured, perceived, and governed. We therefore include four groups of variables – settlement-urbanization, geographical, socio-demographic, and economic – each capturing a key dimension along which PURs vary and which may plausibly influence naming decisions:

^a Interdisciplinary Doctoral School of Social Sciences Academia Rerum Socialium, Nicolaus Copernicus University in Toruń, Toruń, Poland (*corresponding author: D. Wysocka-Niemiec, e-mail: d.wysocka@doktorant.umk.pl)

^b Public Governance Institute, KU Leuven, Leuven, Belgium

^c Department of Geography, Ghent University, Ghent, Belgium

^d Department of Urban Studies and Sustainable Development, Institute of Social and Economic Geography and Spatial Management, Faculty of Earth Sciences and Spatial Management, Nicolaus Copernicus University in Toruń, Toruń, Poland

- Settlement-urbanization variables reflect the morphological and functional relationships between centers, which may shape the feasibility or desirability of certain naming strategies (e.g., merging names in tightly integrated regions).
- Geographical variables capture physical and spatial constraints or opportunities (e.g., proximity, barriers, or centrality) that may affect both regional integration and naming practices.
- Socio-demographic variables provide insight into the population dynamics and diversity of the region, which may influence identity formation and naming legitimacy.
- Economic variables relate to the development level and economic interdependencies within the region, which may underpin strategic naming choices aimed at branding or signaling cohesion.

Collectively, these variables allow us to explore the contexts in which different naming strategies emerge and to identify the characteristic configurations associated with each. By analyzing 312 PURs across the globe, we aim to uncover general patterns in naming practices and offer a more nuanced understanding of how naming relates to regional structure and development trajectories.

The remainder of this paper is organized in four main sections. The following section positions our research in the literature on polycentric urban regions and discusses the politics of naming. This is followed by a presentation of our methodology and the primary data sources. We then provide an overview of our main results, after which the paper is concluded with a discussion of findings, implications, and potential avenues for further research.

2. Literature review: the politics of naming polycentric urban regions (PURs)

We begin by reviewing earlier research that collectively provides the background for our study. According to Meijers et al. (2018), as many as a quarter of Europeans now live in regions that exhibit PUR-like features. While this salience partially explains why research on polycentricity originated primarily from debates in Northwestern Europe (Dieleman & Faludi, 1998), it has now attracted global interest (Derudder et al., 2022; Harrison et al., 2022). The literature points to there being at least two major spatial scales of polycentricity: intra-urban and inter-urban (Granqvist et al., 2019). Intra-urban polycentricity refers to situations where population and economic activities shift from the central parts of a city to its peripheries, leading to the emergence of new urban subcenters (Meijers, 2007; Lichter & Malý, 2023). On the other hand, inter-urban polycentricity refers to the integration of regions with several physically separate cities with major roles instead of having a single dominant center (Veneri & Burgalassi, 2012). In principle, PURs capture the latter.

Importantly, PURs are not only a conceptual and analytical tool for understanding and describing urban and regional empirical realities but are also often seen as providing a promising policy perspective on urban and regional development (Derudder et al., 2022). PURs are attracting increasing policy attention because of a range of alleged benefits in terms of sustainable development, increased competitiveness, and social cohesion (Vandermotten et al., 2008; Veneri & Burgalassi, 2012; Malý & Mulíček, 2016). Therefore, cooperation within PUR contexts is often framed as a politically desirable and promising avenue for the cities comprising them, providing them with opportunities for development, integration and recognition in a larger context (Meijers & Burger, 2010; Sun & Lv, 2020). This has led to a plethora of studies on regional integration processes in PURs, many of which focus on regional integration through corporate (Taylor et al., 2009a; Van Oort et al., 2010; Hanssens et al., 2014) and

transportation networks (Liu et al., 2016, 2023; Yang et al., 2018), or the agglomeration and network externalities arising in PURs (Meijers & Burger, 2010, 2017). Here, we focus on a less-studied form of integration: how the ‘regional collective’ of a PUR is represented in their naming.

The study of assigning names to places is also known as toponymy (Tentand & Blair, 2011; Conedera et al., 2007), which has the potential to provide an interesting window into understanding and experiencing places and territories. Despite constantly interacting with placenames, we often overlook their full significance, reducing the role of naming to a mere tool for identifying and organizing space. Light and Young (2015) argued that, until recently, by primarily focusing on the meaning of placenames and their origins, the inherent potential of toponymical research was not fully appreciated in the scientific community. However, placenames are much more complex and multifaceted and represent more than mere neutral labels (Conedera et al., 2007). A new approach, which Rose-Redwood (2011, 2016) described as a ‘critical turn’ in placename studies, argued for moving toward understanding the politics of place naming and its significance in specific social and cultural contexts.

Placename studies emphasize that one of the crucial elements of how places and territories ‘become’ is through their naming. This applies to places at different scales and territories of different extents and therefore also urban regions. Although PURs rarely exist as formally defined regions, they partly come into existence by the name given to them. This ability to bring something into ‘existence’ was already identified by Tuan (1991). He argued that naming has the power to “create a seemingly coherent reality out of a congeries of disparate parts” (1991, p. 689). This observation again proves the importance of naming PURs, consisting of historically and administratively distinct and previously independent cities, now integrated into a single functional region (Meijers, 2007; Meijers et al., 2018; Liu et al., 2018).

Indeed, as Light and Young (2015, p. 436) pointed out, names “are not accidental or politically neutral, but are chosen and foregrounded as being somehow ‘appropriate’, while other, less acceptable, names are overlooked or marginalized”, with different locations carrying different symbolic significance (Gnatiuk & Glybovets, 2020). However, the choice of a name for a PUR and its meaning depends on the actors behind the process and thus on the perspective and objectives they represent. Giraut and Houssay-Holzschuch (2016) distinguish three main groups of actors that differ in their patterns of subjectification: state power, the private sector and civil society. Regardless of the perspective, the name is associated with possessing a certain power and control over a place (Myers, 1996) and becomes a tool in the hands of those who have the power to confer it. Names are given to smaller objects, such as streets or squares, as well as to larger ones – neighborhoods, cities or even entire regions (Medway & Warnaby, 2014). Each category requires a specific approach in toponymy research. Regardless of the scale to which naming practices apply, place names are often the result of careful and deliberate efforts oriented toward reflecting the alleged character of a place. As Myers (1996, p. 238, *cf.* Cohen & Klot, 1992) pointed out in the case of naming regions in the context of countries with strong regional identities, names often set boundaries for regional cultures, so that “affixing names to places is inextricably linked with nation building and state formation”. Although the author directly refers to the state, his observations are equally relevant in the context of the formation of urban regions. The name of the Randstad region, which is often considered to be a PUR archetype (Derudder et al., 2022), reflects the process of shaping urban identity within the Dutch polycentric model and the strategic effort to highlight the region's unique structure (Van Meeteren, 2022).

PUR naming processes, therefore, involve additional attention to consider the different cities' uniqueness while emphasizing coherence, connectivity, and unity within the urban region as a whole. For a name to effectively represent the entire region, the process should be preceded by an analysis of shared characteristics and values. In addition, attention should also be given to ensuring the name reflects not only the current form of the region but also its development potential. It, therefore, becomes equally important to develop a vision for the future that reflects shared ambitions and goals (Cardoso & Meijers, 2017). If the name is recognized and positively perceived in each of the region's cities, it can encourage its residents to identify with it and the whole urban region (Rozenkiewicz & Łach, 2012). It reinforces a perception of belonging and distinctiveness in a broader social and geographic context. That is, it describes 'us' as a society and thereby differentiates 'us' from 'others' (Myers, 1996; Van Houtum & Lagendijk, 2001; Rose-Redwood et al., 2010). This indicates another essential function of naming urban regions: its supposed ability to shape a collective regional identity (Van Houtum & Lagendijk, 2001; Peteet, 2013; Giraut & Houssay-Holzschuch, 2016).

Examining the names of well-known polycentric urban regions, one can see their diversity, indicating the variety of practices through which they were created. Based on six case studies, Cardoso and Meijers (2017) classified their names into one of three categories: expansion, merger, and a new name. Understanding how these different approaches affect the region's functioning is essential for effectively shaping its character. The name adoption of the dominant city, a phenomenon called expansion, as in the cases of Stoke-on-Trent or New York, can reflect the demographic or institutional advantage of one center and the desire to use its established brand for a wider area, thereby reinforcing its central role in the region. Meanwhile, mergers, as exemplified by the cases of Budapest or Charleville-Mezieres, can promote a sense of equality and mutual cooperation between cities. They tend to occur where there are two or three cities of similar rank; the combined name is then a symbolic compromise, emphasizing the equality of the partners and avoiding hierarchy. And finally, the choice of a new name, such as Randstad or Flemish Diamond, can symbolize a new beginning or a change of direction for the region. It may appear when the number of cities is too big or too diverse to combine their names, no center dominates, and the region needs a new, clear label on the national or international arena. In each region, a different approach may prove effective. The authors indicate that geographical, socio-political and historical-cultural factors influence the decision-making process. Taking their research as a starting point, we extend it in this paper by drawing on a dataset of 312 selected PURs and analyzing them in terms of selected settlement-urbanization, geographic, socio-demographic and economic indicators.

3. Methodology and data

Our data collection consisted of two main stages: (1) creating a list of urban regions potentially exhibiting PUR-like features and (2) collecting data on settlement-urbanization, geographical, socio-demographic, and economic factors for these urban regions. In the first stage, it was essential to identify the sources from which information could be obtained to enable the identification of potential PUR. While naming conventions ideally reflect policy narratives and public discourse, the diversity of languages, institutional contexts, and document types makes such an approach difficult to implement consistently at a global scale. Consequently, the analysis was based on scientific articles, which – unlike policy documents – provide coherence and comparability at the international level. It should be noted that the names examined do not necessarily correspond to formal administrative units – most PURs lack official territorial status – but are instead

constructs primarily employed in academic discourse. As these names emanate from scientific publications, we assume that these names reflect objective naming practices rather than subjective wish lists: names sourced from the scientific literature are more likely to be accurate and reliable than those found in non-academic sources.

The list of PURs was created based on a content analysis of scientific articles indexed in Elsevier's Scopus database. We chose this database because it is more frequently updated and detailed in terms of article citations than the other two often-used databases in scientometric research, i.e., the Web of Science and Google Scholar. In addition, Scopus also offers a broader range of journals than the Web of Science and has higher quality standards for research to enter the database than Google Scholar (Falagas et al., 2008; Van Meeteren et al., 2016). To compile the list of PURs, we searched for the term 'polycentr*' in title, keywords and abstract. The results were limited to publications from the social sciences and published in English. Although this limitation to social sciences may exclude valuable perspectives from other disciplines, we implemented it with an awareness of the analogous meanings of polycentrism in other fields and the resulting 'stretching' of this concept (Van Meeteren et al., 2016). In addition, focusing exclusively on publications in English overlooks significant research conducted in other languages, potentially leading to the loss of essential findings and diverse viewpoints from non-English speaking countries. However, we limited ourselves to English because it is the most commonly used language in scientific discourse, facilitating broader accessibility, dissemination, and review of research findings globally. This led to 2,479 papers that addressed 'polycentricity' (as of 1 October 2023).

We aimed to focus on studies that have significantly influenced the field to ensure the quality and relevance of the data. Therefore, we applied an impact criterion, only considering papers with more than 50 citations. This approach initially resulted in 268 scientific articles. Further content analysis revealed that some articles discussed polycentricity in different contexts rather than explicitly referring to the polycentricity of urban regions. These were also excluded, ultimately leaving us with 146 articles. Each of the remaining articles was subjected to a detailed content analysis, with all PURs mentioned in our dataset. The result is a list of 367 PUR 'names'.

Due to the heterogeneous availability and precision of data across regions, it was necessary to adopt a consistent and comparable delimitation approach. For this purpose, we used data on urban centers from the Global Human Settlement (GHS) database (Florczyk et al., 2019a), which serves a dual role in the study: it enabled the identification of the spatial extent of the units under analysis and provided a uniform data source for subsequent analyses. Urban centers are defined there as "the spatially-generalized high-density clusters of contiguous grid cells of 1 km² with a density of at least 1,500 inhabitants per km² of land surface or at least 50% built-up surface share per km² of the land surface, and a minimum population of 50,000" (Florczyk et al., 2019b, p. 13). If the PUR was classified as an urban center according to the GHS classification, it was also included in our analysis. This comparison reduced the list of PURs to its final number of 312 (see Appendix 1). Focusing on these allows us to apply a uniform set of variables across the entire sample, which is a necessary prerequisite for conducting a comparative quantitative analysis at the global level.

We assigned the names of each PUR to one of the three categories put forward in Cardoso and Meijers (2017): expansion, merger, or new name. When the name of a region was also the name of one of its cities (e.g., Los Angeles Region, Greater London, Shanghai), we classified it as expansion. When the name was a combination of the names of at least two cities of the region, often separated by a hyphen (e.g., Frankfurt-Mainz-Giessen, Gdansk-Gdynia, Milan

and Turin), we classified it as a merger. Finally, when the name did not refer to any of the region's cities (e.g., Central Scotland, Yangtze River Delta, Flemish Diamond), it was classified as a new name. By proceeding this way, we obtained 107 regions in the expansion category, 113 in the merger category, and 92 in the new name category. While this classification is relatively crude, it provides a coherent conceptual handle for our global analysis and the many cases. In some cases, the same city, appeared in more than one regional configuration differing in scope or the set of included centers (e.g., Frankfurt). Rather than selecting a single configuration, we treated all variants documented in the literature as independent observations.

Stage two involved the collection of data on settlement-urbanization (6 variables), geographical (11 variables), socio-demographic (4 variables), and economic (3 variables) factors (Tab. 1). This selection of (categories of) variables is grounded in how the literature has empirically approached the nature and functioning of polycentric urban regions (PURs), rather than in a normative or theoretical model. The adopted set of variables thus captures the key dimensions of PUR differentiation, which are essential to understanding how their distinct characteristics and developmental conditions are reflected in the applied naming strategies. The four categories – settlement-urbanization, geographical, socio-demographic, and economic – and the concrete

Variable	Source	Description
Settlement-urbanization factors		
x ₁ Number of cities	GHSL data on Urban Centers	Number of cities located in a given PUR.
x ₂ Number of main cities (based on population)	Own elaboration based on World Population Review	Number of main cities based on proportional population criteria relative to the largest city.
x ₃ Presence of a dominant city	Own elaboration based on World Population Review	Presence of a dominant city when there is only one main city in the region.
x ₄ Population ratio of second city to largest city in the region	Own elaboration based on World Population Review	Proportion of the second largest city's population relative to the largest city in the region.
x ₅ Number of urban centers	Own elaboration based on GHSL data on Urban Centers	Number of urban centers in a given PUR, defined as contiguous high-density areas ($\geq 1,500$ inhabitants/km ₂) with a minimum population of 50,000.
x ₆ Structure of region (based on number of Urban Centers)	Own elaboration based on GHSL data on Urban Centers	Structure of region classified as compact (one urban center) or dispersed (two or more urban centers).
Geographical factors		
x ₇ Area of region [km ²]	Own elaboration based on GHSL data on Urban Centers	The area of the region, equal to the total area of the urban center(s) it encompasses in 2015.
x ₈ Total built-up area of region [km ²]	Own elaboration based on GHSL data on Urban Centers	The total built-up area of the region, equal to the total built-up area of the urban center(s) it encompasses in 2015.
x ₉ Share of built-up area in total area of region [%]	Own elaboration based on GHSL data on Urban Centers	The proportion of the variable 'Total built-up area of region' to the variable 'Area of region'.
x ₁₀ Travel time between the most distant cities in the region [']	Own elaboration based on Google Maps	The time required to travel between the two most distant cities within the region, measured in minutes for car travel.
x ₁₁ Distance between the most distant cities in the region [km]	Own elaboration based on Google Maps	The distance between the two most distant cities within the region, measured in kilometers for car travel.
x ₁₂ Travel time to country capital [']	GHSL data on Urban Centers	The time required to travel from the boundary of an urban center in the region to the boundary of the capital city's urban center. If the region contained more than one urban center, the shortest travel time was selected.
x ₁₃ Is the region cross-border?	GHSL data on Urban Centers	Indicates whether the region contains an urban center that spans across the borders of two or more countries, based on the spatial distribution of urban centers and their relation to international administrative boundaries.
x ₁₄ Presence in the region of the largest city of the country (based on population)	World Population Review	Indicates whether the region contains the largest city in the country by population.
x ₁₅ Major geographical region	GHSL data on Urban Centers	The major geographical region (Florczyk et al., 2019b) based on the United Nations regional classification (UNDESA, 2018), assigned according to the country where the majority of the urban center is located.
x ₁₆ Geographical region	GHSL data on Urban Centers	The geographical region (Florczyk et al., 2019b) based on the United Nations subregional classification (UNDESA, 2018), assigned according to the country where the majority of the urban center is located.
x ₁₇ Country	GHSL data on Urban Centers	The name of the main country, based on where the majority of the urban center is located (UNDESA, 2018).
Socio-demographic factors		
x ₁₈ Population of region	Own elaboration based on GHSL data on Urban Centers	Total resident population of the region, equal to the total resident population of the urban center(s) it encompasses in 2015.
x ₁₉ Population density of region [ppl/km ²]	Own elaboration based on GHSL data on Urban Centers	The proportion of the variable 'Population of region' to the variable 'Area of region'.
x ₂₀ Population living in the country's largest city relative to the country's total population [%]	Our world in data	The percentage of the total population of a country, in which the given region is located, that resides in its largest city.
x ₂₁ Population living in cities relative to the country's total population [%]	Our world in data	The percentage of the total population of the country, in which the region is located, that resides in urban areas.
Economic factors		
x ₂₂ The highest GaWC class in the region (combined)	Own elaboration based on GaWC	The highest-ranking GaWC class assigned to any city within the region, consolidated into general categories.
x ₂₃ Income level of country	World Bank	The classification of the country, in which the region is located, according to its gross national income per capita.
x ₂₄ Level of development of country	World Bank	The development status of the country, in which the region is located.

Tab. 1: Data – sources and descriptions
Source: Authors' elaboration

variables within them reflect the most recurrent dimensions used in analyses of PURs, particularly in studies examining spatial structure, inter-urban relations, and regional integration. By focusing on these (categories of) variables, we explicitly align our analysis with established empirical traditions, ensuring comparability and relevance across cases. Settlement-urbanization variables provide insight into the settlement structure of regions by analyzing the number, importance, and distribution of their urban centers. Geographic variables differentiate regions in terms of their size, role on the national scale, and location in a broader geographic context. Socio-demographic variables provide basic information on the population and its concentration in the regions and also allow an assessment of the impact of national urbanization. Economic variables, on the other hand, provide information on the regions' place in the global urban network, as well as the income level and level of development of the country in which they are located. Collectively, these variables enable us to capture the complex nature of the regions and ensure a comprehensive and comparative analysis. Most of the data was obtained directly from our data sources. Still, two variables ('number of main cities' and 'structure of region') were constructed and require further explanation due to our modifications and adaptations of existing data. For the number of main cities, we counted the number of cities that met specific proportional criteria: the second city needed at least half of the largest city's population, the third city at least one-third, the fourth city at least one-fourth, and so on. Meanwhile, the structure of the region was determined based on the number of urban centers: we considered a region to be compact if it included only one urban center and dispersed when at least two urban centers were present in the region.

We then matched these data to the naming of the regions, thus allowing an assessment of the relationship between the naming approach and a broad range of variables. To this end, using the R programming environment, we implemented a series of parametric tests such as ANOVA and Chi-Square tests to compare means within groups and assess the relationship between categorical variables. In addition, we also applied non-parametric tests, i.e., the Kruskal-Wallis and Fisher's exact tests in cases where the data do not fulfil the assumptions required by parametric tests: Kruskal-Wallis allowed for the assessment of differences between groups without having to satisfy the condition of normality of distribution. The Fisher Exact test, in turn, provided more

accuracy for a small number of observations of each category and was used to analyze the contingency tables. The analysis allowed for identifying existing correlations or their absence and assessing their possible strength and direction.

4. Results

The first part of our analysis focused on settlement-urbanization variables (Tab. 2). Regions in the new name category averaged 12 cities, significantly higher than those in the expansion (four cities) and merger (five cities) categories. In terms of main cities, expansion regions stood out significantly, averaging only one main city, which indicates its dominant position in the region. In contrast, regions in merger and new name categories averaged two and three main cities, respectively, suggesting a lack of such dominance. The population ratio of the second most populated city to the largest city indicates that regions in the merger and new name categories had a more even population distribution than those in the expansion category. Additionally, expansion regions typically included only one urban center according to the GHSL classification, indicating their compact nature (98.1% being compact). In contrast, the merger and new name categories more often contained multiple urban centers, suggesting a more dispersed character (61.1% and 65.2% being dispersed, respectively).

The analysis of geographical factors (Tab. 3) shows that the regions in the merger category are significantly smaller, averaging 507 km², compared to those in the expansion category at 870 km² and especially the new name category, which averages 1,296 km². This observation applies to both total and built-up areas. Focusing on built-up areas, regions in the merger category have an average size of 353 km², while those in the expansion category average 625 km² and the new name category 933 km². The share of built-up area in the total area of the region reached the highest value in regions in the new name category (68%), followed by expansion (66%) and merger categories (63%). In addition, the values for distance and travel time between the most distant cities in the region are higher in the new name (208 km, 137 minutes) and merger (86 km, 71 minutes) categories, which are more dispersed compared to the more compact regions classified as expansion (53 km, 53 minutes). There is no significant relationship between the type of naming

Variables	N	Kind of name			Test statistics	Df	Effect size ^a	p-value ^b
		expansion N = 107	merger, N = 113	new name, N = 92				
x ₁ Number of cities	312				44.52	2	0.14	< 0.001
Mean (SD)		4 (6)	5 (6)	12 (14)				
Median (IQR)		1 (1, 4)	2 (2, 4)	6 (3, 13)				
x ₂ Number of main cities	312				43.69	2	0.14	< 0.001
Mean (SD)		1 (1)	2 (1)	3 (5)				
Median (IQR)		1 (1, 1)	1 (1, 2)	1 (1, 3)				
x ₃ Presence of dominant city, N (Column %)	312				43.07	2	0.36	< 0.001
YES		97 (90.7%)	58 (51.3%)	53 (57.6%)				
NO		10 (9.3%)	55 (48.7%)	39 (42.4%)				
x ₄ Population ratio of the second most populated city to the largest city	205				47.07	2	0.23	< 0.001
Mean (SD)		0.26 (0.23)	0.60 (0.26)	0.53 (0.27)				
Median (IQR)		0.18 (0.08, 0.35)	0.63 (0.40, 0.81)	0.55 (0.34, 0.72)				
x ₅ Number of urban centers	312				106.94	2	0.34	< 0.001
Mean (SD)		1 (0)	2 (1)	5 (6)				
Median (IQR)		1 (1, 1)	2 (1, 2)	2 (1, 5)				
x ₆ Structure of region, N (Column %)	312				107.96	2	0.58	< 0.001
Compact		105 (98.1%)	44 (38.9%)	32 (34.8%)				
Dispersed		2 (1.9%)	69 (61.1%)	60 (65.2%)				

Tab. 2: Settlement-urbanization variables

Notes: ^aFor the Kruskal-Wallis test, the effect size was calculated using eta squared for ordinal data (η^2 ordinal). The effect size was calculated using Cramer's V for the chi-squared test; ^bKruskal-Wallis rank sum test; Pearson's Chi-squared test

Source: Authors' elaboration

	Variables	N	Kind of name			Test statistics	Df	Effect size ^a	p-value ^b
			expansion N = 107	merger, N = 113	new name, N = 92				
x ₇	Area of region [km ²]	312				29.66	2	0.10	< 0.001
	Mean (SD)		870 (1, 161)	507 (1,079)	1,296 (2,254)				
	Median (IQR)		377 (124, 1,151)	106 (49, 370)	339 (112, 1,343)				
x ₈	Total built-up area of region [km ²]	312				30.91	2	0.10	< 0.001
	Mean (SD)		625 (885)	353 (790)	933 (1,694)				
	Median (IQR)		244 (71, 851)	69 (27, 230)	220 (78, 969)				
x ₉	Share of built-up area in total area of region [%]	312				5.51	2.309	0.03	0.004
	Mean (SD)		66 (11)	63 (11)	68 (10)				
	Median (IQR)		65 (58, 73)	64 (55, 70)	68 (60, 73)				
x ₁₀	Travel time between the most distant cities in the region [']	203				15.90	2	0.08	< 0.001
	Mean (SD)		53 (36)	71 (59)	137 (181)				
	Median (IQR)		38 (25, 69)	53 (38, 77)	82 (37, 179)				
x ₁₁	Distance between the most distant cities in the region [km]	203				22.23	2	0.11	< 0.001
	Mean (SD)		53 (42)	86 (89)	208 (300)				
	Median (IQR)		36 (21, 81)	58 (37, 95)	110 (41, 256)				
x ₁₂	Travel time to country capital [']	312				0.65	2	0.002	0.72
	Mean (SD)		320 (503)	304 (448)	418 (623)				
	Median (IQR)		150 (39, 255)	159 (85, 326)	165 (42,450)				
x ₁₃	Is the region cross-border?, N (Column %)	312				–	–	–	0.947
	YES		5 (4.7%)	5 (4.4%)	5 (5.4%)				
	NO		102 (95.3%)	108 (95.6%)	87 (94.6%)				
x ₁₄	Presence in the region of the largest city of the country (based on population), N (Column %)	312				13.03	2	0.19	0.001
	YES		22 (20.6%)	5 (4.4%)	14 (15.2%)				
	NO		85 (79.4%)	108 (95.6%)	78 (84.8%)				
x ₁₅	Major geographical region	311	–	–	–	–	–	–	< 0.001*
x ₁₆	Geographical region	312	–	–	–	–	–	–	< 0.001*
x ₁₇	Country	312	–	–	–	–	–	–	< 0.001*

Tab. 3: Geographical variables

Notes: ^aTest statistics, degrees of freedom, and effect size measures are not provided for categorical variables as these were assessed using Fisher's Exact Test, which does not compute these values; ^bThe effect size was calculated using eta squared for ordinal data (η^2_{ordinal}) for the Kruskal-Wallis test. The effect size was calculated using omega squared (ω^2) for the Fisher's ANOVA test. The effect size was calculated using Cramer's V for Pearson's chi-squared test; ^cKruskal-Wallis rank sum test, except for 'Share of built-up area in total area of region', which was analyzed using Fisher's ANOVA; Fisher's exact test (*the p-value was obtained using a simulation method), except for 'Presence in the region the largest city of the country', which was analyzed using Pearson's chi-squared test.

Source: Authors' elaboration

and travel time to the national capital or the cross-border nature of the regions. However, the presence of the country's largest city in a region is significant. It is most common in regions in the expansion category (20.6%), less so in the new name category (15.2%), and only 4.4% in the merger category. Among the PURs, the majority (69.4%) are in Europe, followed by 15.0% in North America (mainly the US (95.7%)) and 12.7% in Asia (primarily China (85.0%)). In Europe, most regions were classified in the merger category (42.7%). In contrast, the regions in the US were classified as expansions (48.9%), most clearly exemplified by the Los Angeles region. The most common regions in China are those bearing new names (55.9%), such as the Yangtze River Delta. Analyzing the breakdown by world region in more detail, we can see internal European differentiation. The expansion category dominates Northern Europe, especially in the UK (48.9%), with Greater London being a prime example. The merger category is leading in Eastern Europe, with notable examples such as Bydgoszcz-Torun in Poland (71.4%) and Olomouc-Zlín-Prerov-Prostejov in the Czech Republic (80.0%), and in Southern Europe, mainly in Italy (35.5%), with regions like Padua-Treviso-Venice and in Spain (72.7%), with for example Oviedo-Gijón-Aviles. In Western Europe, there is a balance between the merger (42.2%) and new name (40.2%) categories, with mergers being more common in France (76.7%), such as Reims-Troyes-Chalons-sur-Marne and Germany (59.1%) with Erfurt-Jena-Weimar and the new names in the Netherlands (82.9%), with the Randstad being an example.

Regarding socio-demographic factors (Tab. 4), we observed that the regions in the merger category had the smallest average population of about 2.5 million inhabitants compared to the other categories (expansion about 4 million and new name about 5.5 million inhabitants). The median population in regions classified in the merger category was significantly lower than in other categories, almost four times less than in the expansion category and nearly five times less than in the new name category. Despite these differences, the average population density remained similar in all categories, with no statistically significant differences. Regions in the merger category also had the lowest urban population percentage at 78%, compared to 81% in expansion and 82% in the new name category. Additionally, the population percentage in the country's largest city was lowest in regions with new names at 9%, versus 14% for both expansion and merger categories.

For the analysis of economic factors (Tab. 5), cities in regions classified into the expansion and new name categories were generally of higher global status, with significant proportions classified in GaWC's two highest connectivity bands: Alpha (24.3% and 20.7%, respectively) and Beta (21.5% and 20.7%, respectively). Conversely, cities in regions classified into the merger category had lower rankings, with only 9.7% and 10.6% in Alpha and Beta classes and over half (61.1%) not classified in any GaWC class, indicating their lower global connectivity. No significant correlations were found while exploring the relationship between region naming categories and income levels. However, we observed a significant link between region names and country development

	Variables	N	Kind of name			Test statistics	Df	Effect size ^a	p-value ^b
			expansion N = 107	merger, N = 113	new name, N = 92				
x ₁₈	Population of region	312				32.37	2	0.10	< 0.001
	Mean (SD)		4,013,540 (6,723,025)	2,481,848 (6,753,123)	5,515,184 (10,365,235)				
	Median (IQR)		1,188,874 (424,575, 3,495,699)	327,849 (163,386, 1,117,939)	1,524,623 (369,428, 5,124,842)				
x ₁₉	Population density of region [ppl/km ²]	312				5.57	2	0.02	0.06
	Mean (SD)		4,231 (2,556)	3,721 (1,964)	4,581 (2,710)				
	Median (IQR)		3,423 (2,706, 5,122)	3,060 (2,673, 3,980)	3,451 (2,762, 5,820)				
x ₂₀	Population living in cities relative to the country's total population [%]	297				14.42	2	0.05	< 0.001
	Mean (SD)		81 (9)	78 (9)	82 (11)				
	Median (IQR)		84 (78, 85)	82 (72, 84)	84 (72, 93)				
x ₂₁	Population living in the country's largest city relative to the country's total population [%]	297				23.94	2	0.08	< 0.001
	Mean (SD)		14 (9)	14 (8)	9 (6)				
	Median (IQR)		17 (7, 17)	17 (7, 20)	7 (6, 10)				

Tab. 4: Socio-demographic variables

Notes: ^aFor the Kruskal-Wallis test, the effect size was calculated using eta squared for ordinal data (η^2_{ordinal}); ^bKruskal-Wallis rank sum test
Source: Authors' elaboration

	Variables	N	Kind of name			Test statistics	Df	Effect size ^a	p-value ^b
			expansion N = 107	merger, N = 113	new name, N = 92				
x ₂₂	What is the highest GaWC class in the region? (combined), N (Column %)	312				–	–	–	< 0.001*
	Alpha Combined		26 (24.3%)	11 (9.7%)	19 (20.7%)				
	Beta Combined		23 (21.5%)	12 (10.6%)	19 (20.7%)				
	Gamma Combined		9 (8.4%)	4 (3.5%)	7 (7.6%)				
	High Sufficiency		3 (2.8%)	2 (1.8%)	1 (1.1%)				
	Sufficiency		17 (15.9%)	15 (13.3%)	13 (14.1%)				
	Not classified		29 (27.1%)	69 (61.1%)	33 (35.9%)				
x ₂₃	Income level, N (Column %)	311				–	–	–	0.059
	High income		93 (86.9%)	101 (89.4%)	72 (78.3%)				
	Upper middle income		12 (11.2%)	12 (10.6%)	19 (20.7%)				
	Lower middle income		2 (1.9%)	0 (0%)	0 (0%)				
x ₂₄	Level of development, N (Column %)	311				–	–	–	0.030
	Developed economies		92 (86.0%)	104 (92.0%)	72 (78.3%)				
	Economies in transition		1 (0.9%)	0 (0%)	0 (0%)				
	Developing economies		14 (13.1%)	9 (8.0%)	19 (20.7%)				

Tab. 5: Economic variables

Notes: ^aTest statistics, degrees of freedom, and effect size measures are not provided for categorical variables as these were assessed using Fisher's Exact Test, which does not compute these values; ^bFisher exact test (*the p-value was obtained using a simulation method)

Source: Authors' elaboration

levels. Developed economies dominated across all categories, with the highest score in the merger category (92.0%), followed by expansion (86.0%) and a new name (78.3%). Developing economies were most prevalent in regions with a new name (20.7%), less so in those in the expansion (13.1%) and merger categories (8.0%). Only one region from a transitioning economy appeared in the expansion category (0.9%).

5. Discussion

Applying Cardoso and Meijers' (2017) classification of regional naming approaches to a global database, we have shown that PUR naming can be linked to a range of dimensions related to their nature, structure, and functioning. This suggests that their naming is indeed not a mere tool for identification but also reflects several underlying dimensions regarding their settlement-urbanization, geographical, socio-demographic, and economic characteristics. The following observations stand out.

Regions classified in the expansion category tend to be characterized by a hierarchical structure, in which a single city

serves as the primary center. The remaining centers, which are few and/or considerably smaller are clustered in its immediate vicinity more akin to intra-urban polycentricity (Pain, 2008). In terms of geographic variables, these regions cover a relatively smaller total area with the shortest distances between their most distant cities being relatively small. The prevalence of the expansion pattern in the United States aligns with Van Meeteren et al. (2016), who find that in the US context, the dominant settlement pattern is intra-urban polycentricity. Demographically, regions classified to expansion category combine a population size that is intermediate between the other two categories with high density and a large share of residents concentrated in the primary city, further reinforcing its central role. Economically, they display the highest proportion of centers ranked in the top GaWC classes, indicating strong integration of their core city into global networks (*cf.* Taylor et al., 2009b). It can thus be presumed that the expansion strategy is primarily present when the main center possesses substantial symbolic and institutional capital. Extending its name to the entire region maximizes external recognition and can help attracting international resources. At the same time, such an

intense concentration of reputation around a single center may entrench a center-dominated development trajectory, limiting the propensity for more balanced forms of intra-regional cooperation (Liu et al., 2018).

Regions classified in the fusion category exhibit a more balanced urban hierarchy, with limited dominance by a single center and aligning most closely with the concept of inter-urban polycentricity (Meijers, 2007, Veneri & Burgalassi, 2012). Geographically, fusion regions occupy the smallest total and built-up areas of all types, yet distances between their most distant cities are moderate: larger than in expansion regions but smaller than in new name regions. They most frequently appear in Europe, whose settlement network is characterized by “quite proximate small and medium-sized cities” united within a single region (Meijers et al., 2018, p. 2). Demographically speaking, fusion PURs are among the least densely populated of the three types and are often located in countries with a lower percentage of urban population. Moreover, the cities that comprise these regions fall into lower GaWC categories, indicating they are less likely to occupy key positions in global urban networks (*cf.* Taylor et al., 2009b). These characteristics indicate that in such cases PURs are best envisioned as a possible means to develop through cooperation and integration with other cities, and may even represent a strategic attempt to strengthen their position and influence. In the European context, this is facilitated by a political environment in which polycentricity on the regional scale is sometimes presented “as the panacea for balanced spatial development” (Vandermotten et al., 2008, p. 4).

And finally, regions classified in the new name category are, on average, characterized by an extensive settlement structure consisting of numerous, relatively similarly-sized cities, among which no single center exerts clear demographic dominance. This configuration best embodies inter-urban polycentricity, although compared to fusion regions, polycentricity here takes a more elaborate form. These regions cover the largest total and built-up areas, with the longest distances between their most distant cities, reflecting their broad geographic extent. They are most commonly found in Asia, particularly in China, where urbanization, marketization, and globalization have driven a shift from compact to polycentric urban patterns across multiple geographic scales (Liu et al., 2018). Regions classified as new names also concentrate the largest populations and tend to occur in countries with both the highest share of urban residents and the lowest proportion of inhabitants concentrated in the nation's largest city. Economically, they exhibit the most internally diverse profile, encompassing cities ranked in the top GaWC tiers alongside a substantial number of cities not classified. Moreover, although they primarily appear in highly developed countries, this category shows a relatively large presence of developing economies. By forgoing reference to any single existing city, new name strategies reduce potential hierarchical tensions and enable the construction of a shared development narrative in which each center functions as a complementary element of a unified system. Configurations without a clearly dominant core reinforce the need for a label capable of representing functionally differentiated yet equal cities, as exemplified by the Randstad (Meijers, 2007).

The results of our study correspond with the findings of Cardoso and Meijers (2017), who emphasize that the names of metropolitan regions lay a role in defining their meaning and shaping their identity. The names of PURs reflect both their spatial organization and the broader conditions under which these regions operate. Differences between naming strategies reflect diverse regional forms and varying developmental contexts. In this way, names serve as expressions of the specific spatial and functional relationships that shape individual regions.

6. Conclusions

Regardless of the degree of integration of PURs, their naming can be a critical and telling element of how its parts are integrated. We have shown that naming a region does not need to be a neutral exercise but can be linked to different dimensions of PURs' characteristics and functioning. The choice of names for PURs can, therefore, be regarded as a key stage in the strategic planning and management of the region, especially when and where it represents a deliberate process tailored to the area's characteristics. Our analysis shows that naming often reflects a PUR's internal structure and level of integration: expansion is present when there is a dominant position of the core city; fusion captures a constellation of more equal partners; and the new name strategy is used in the most complex configurations, establishing a shared, neutral identity framework.

A limitation of our study lies in the source of naming conventions for polycentric regions, which are derived from scientific literature rather than from policy documents or public discourse. Ideally, naming would be grounded in how regions are framed in actual policy narratives, as this would more directly reflect the institutional and political realities of regional governance. However, implementing such an approach at a global scale presents substantial challenges. These include not only linguistic and operational barriers – such as accessing and interpreting documents in multiple languages and formats – but also the difficulty of consistently defining what constitutes a ‘policy document’ across diverse governance contexts. These issues are deeply intertwined and make a systematic, comparative analysis based on policy sources currently unfeasible. In this light, scientific literature represents a pragmatic compromise: while it may not fully capture the lived or institutional naming practices, it offers a consistent, accessible, and methodologically tractable foundation for cross-regional comparison. At the same time, focusing on the most frequently cited academic publications directs the study's attention primarily to developed countries, risking the overlooking of distinctive polycentricity patterns characteristic of developing countries.

In light of our findings, we argue that naming can become a tool in the hands of regional authorities to help shape the coherence of PURs in the longer term. Given this, an obvious next step in research on this matter would be to empirically determine how different PUR naming strategies translate into the attitudes and behaviors of their residents, as well as their perception and identification with the region and their intra-regional cooperation. This approach can influence the formation or strengthening of collective regional identities (Van Houtum & Lagendijk, 2001), contributing to a region's internal cohesion and strengthening its external image.

Acknowledgement

This work was supported by „Maestro“ research project No. 2020/38/A/HS4/00312 funded by the Polish National Science Centre.

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Please cite this article as:

Wysocka-Niemiec, D., Derudder, B., & Biegańska, J. (2025). Labels of regional integration: The case of naming in polycentric urban regions. *Moravian Geographical Reports*, 33(4), 221–234. <https://doi.org/10.2478/mgr-2025-0018>

Appendix

Appendix 1: List of polycentric urban regions (PURs)

	Region	Kind of name	Country	No. of mentionings in the literature
1	Agglomeratie Amsterdam	expansion	Netherlands	1
2	Alençon – Le Mans – Tours	merger	France	1
3	Algeciras	expansion	Spain	1
4	Alicante – Elche	merger	Spain	1
5	Almería – Roquetas – Ejido	merger	Spain	1
6	Altamura	expansion	Italy	1
7	Ancona – Fano	merger	Italy	1
8	Antwerp	expansion	Belgium	1
9	Apulia	new name	Italy	1
10	Area that includes Nottingham, Leicester, and Derby	merger	United Kingdom	1
11	Arizona Sun	new name	United States	1
12	Arnhem – Nijmegen – Apeldoorn – Wageningen	merger	Netherlands	1
13	Atlanta/Greater Atlanta	expansion	United States	3
14	Barcelona/metropolitan region of Barcelona	expansion	Spain	5
15	Bari	expansion	Italy	2
16	Basel – Mulhouse	merger	France/Germany/Switzerland	1
17	Basque Country	new name	Spain	4
18	Bassin Parisien	new name	France	2
19	Beijing metropolitan area	expansion	China	2
20	Beijing – Tianjin – Tangshan	merger	China	1
21	Bern – Neuchâtel – Biel – Thun	merger	Switzerland	1
22	Beziers – Narbonne	merger	France	1
23	Bielefeld – Detmold	merger	Germany	1
24	Birmingham/Greater Birmingham	expansion	United Kingdom	3
25	Blackburn	expansion	United Kingdom	1
26	Bonn – Düsseldorf – Cologne	merger	Germany	1
27	Brabantse Stedenrij (Breda, Tilburg, Eindhoven, Den Bosch)	new name	Netherlands	1
28	Braunschweig – Wolfsburg	merger	Germany	1
29	Brighton	expansion	United Kingdom	1
30	Bristol	expansion	United Kingdom	1
31	Brittany (France)	new name	France	1
32	Brussels region	expansion	Belgium	3
33	Brussels – Louvain – Ghent	merger	Belgium	1
34	Buffalo	expansion	United States/Canada	1
35	Bydgoszcz – Toruń	merger	Poland	1
36	Cádiz – Jerez – Sanlúcar	merger	Spain	1
37	Calarasi – Silistra	merger	Bulgaria/Romania	1
38	Calcutta	expansion	India	1
39	Campania	new name	Italy	1
40	Cardiff	expansion	United Kingdom	1
41	Cardiff and South Wales	expansion	United Kingdom	1
42	Cascadia	new name	United States	1
43	Centraal and Westelijk Groningen	new name	Netherlands	1
44	Central Anhui	new name	China	2
45	Central Belgium	new name	Belgium	8
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	Region	Kind of name	Country	No. of mentionings in the literature
46	Central Guizhou	new name	China	2
47	Central Inner Mongolia	new name	China	2
48	Central Plain	new name	China	2
49	Central Scotland	new name	United Kingdom	3
50	Central Shanxi	new name	China	2
51	Central Yunnan	new name	China	2
52	Chamber – Annecy	merger	France	1
53	Chang – Zhu – Tan Urban Agglomeration	merger	China	1
54	Chemnitz – Zwickau – Aue – Greiz	merger	Germany	1
55	Chengdu – Chongqing	merger	China	3
56	Chicago/metropolitan Chicago/Chicago urban area	expansion	United States	8
57	Chicago – north-western Indiana	expansion	United States	1
58	City region Cologne	expansion	Germany	1
59	City region Frankfurt	expansion	Germany	1
60	City region Stuttgart	expansion	Germany	1
61	Ciudad Real – Puertollano	merger	Spain	1
62	Cleveland	expansion	United States	3
63	Concepcion (Chile)	expansion	Chile	1
64	Copenhagen	expansion	Denmark	2
65	Cosenza – Lamezia Terme	merger	Italy	1
66	Coventry	expansion	United Kingdom	1
67	Creil – Compiègne	merger	France	1
68	Dalian	expansion	China	1
69	Dallas	expansion	United States	1
70	Dallas – Fort Worth/Dallas – Fort Worth Metroplex	merger	United States	4
71	Davenport – Moline – Rock Island	merger	United States	1
72	Decin – Teplice – Usti nad Labem	merger	Czech Republic	1
73	Denver	expansion	United States	1
74	Detroit/metropolitan Detroit	expansion	United States/Canada	3
75	Donostia – San Sebastian – Bayonne	merger	Spain/France	1
76	Dublin region/Greater Dublin	expansion	Ireland	8
77	Dunkerque et billes frontalières (Dunkirk and border towns)	expansion	France	1
78	Dunkerque(Dunkirk) – Calais – Saint – Omer	merger	France	1
79	Eastern Fujian	new name	China	2
80	Eastern Hubei	new name	China	2
81	Eastern Hunan	new name	China	2
82	Eem and Vallei	new name	Netherlands	1
83	Emilia Romagna	new name	Italy	1
84	Enschede – Almelo	merger	Netherlands	1
85	Erfurt – Jena – Weimar	merger	Germany	1
86	Flemish Diamond	new name	Belgium	12
87	Flevoland	new name	Netherlands	1
88	Florence	expansion	Italy	1
89	Florida	new name	United States	1
90	Foggia – San Severo – Manfredonia	merger	Italy	1
91	Fortaleza in Brazil	expansion	Brazil	1
92	Frankfurt – Mainz – Giessen	merger	Germany	1
93	Friesland Noord	new name	Netherlands	1
94	Front Range	new name	United States	1
95	Galati – Braila	merger	Romania	1
96	Gdansk – Gdynia	merger	Poland	1
97	Geneve – Annemasse – Annecy – Cluses	merger	Switzerland/France	1
98	Ghent	expansion	Belgium	1
99	Glasgow – Edinburgh region	merger	United Kingdom	3
100	Gooi and Vechtstreek	new name	Netherlands	1
101	Greater Boston	expansion	United States	1
102	Greater Buenos Aires	expansion	Argentina	1
103	Greater Glasgow	expansion	United Kingdom	1
104	Greater Jakarta	expansion	Indonesia	3
105	Groningen – Assen	merger	Netherlands	1
106	Guangzhou – Shenzhen	merger	China	1
107	Guangzhong Plain	new name	China	2
108	Gulf Coast	new name	United States	1
109	Hamburg	expansion	Germany	1
110	Hangzhou (part of Yangtze River Delta)	expansion	China	1
111	Harbin – Changchun	merger	China	2
112	Heidelberg – Karlsruhe – Stuttgart	merger	Germany	1
113	Helsinki	expansion	Finland	1
114	Houston – Galveston region	merger	United States	1
115	Houston/Houston area	expansion	United States	5
116	Hradec Kralove – Pardubice	merger	Czech Republic	1
117	Ijssel – Vecht	new name	Netherlands	1
118	Ile de France	new name	France	1
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	Region	Kind of name	Country	No. of mentionings in the literature
119	Indianapolis	expansion	United States	2
120	Ipswich – Colchester – Clacton on Sea – Felixstowe	merger	United Kingdom	1
121	Jaen – Linares	merger	Spain	1
122	KAN region (Knooppunt Arnhem Nijmegen)	new name	Netherlands	1
123	Kansai area/Kansai region	new name	Japan	6
124	Kettering – Corby	merger	United Kingdom	1
125	Klagenfurt – Villach – Wolfsberg	merger	Austria	1
126	La Rochelle – Niort – Saintes – Rochefort	merger	France	1
127	La Spezia – Massa – Carrara – Viareggio	merger	Italy	1
128	Lanzhou – Xining	merger	China	2
129	Larisa – Volos	merger	Greece	1
130	Las Vegas	expansion	United States	1
131	Latina	expansion	Italy	1
132	Latium	new name	Italy	1
133	Lausanne – Vevey – Yverdon – Monthey	merger	Switzerland	1
134	Le Havre – Rouen – Caen	merger	France	1
135	Lecce – Brindisi – Gallipoli – Nardo	merger	Italy	1
136	Leeds	expansion	United Kingdom	1
137	Leeds – Bradford	merger	United Kingdom	1
138	Legnica – Jelenia Gora	merger	Poland	1
139	Leicester	expansion	United Kingdom	1
140	Leipzig – Halle	merger	Germany	1
141	Liaodong Peninsula	new name	China	2
142	Liberec – Gorlitz	merger	Poland/Germany/Czech Republic	1
143	Liege	expansion	Belgium	1
144	Lille	expansion	France/Belgium	1
145	Lille – Roubaix – Tourcoing	merger	France/Belgium	1
146	Lima in Peru	expansion	Peru	1
147	Linköping – Norrköping	merger	Sweden	1
148	Linz – Wels – Steyr – Amstetten	merger	Austria	1
149	Liverpool	expansion	United Kingdom	1
150	Liverpool – Birkenhead	merger	United Kingdom	1
151	Lombardy	new name	Italy	1
152	London/Greater London	expansion	United Kingdom	10
153	London – Cambridge	merger	United Kingdom	1
154	Los Angeles/Los Angeles region	expansion	United States	21
155	Los Angeles – Long Beach	merger	United States	2
156	Lower Rio Grande Valley	new name	United States	1
157	Luxembourg	expansion	Luxembourg/Belgium/Germany/France	1
158	Lyon	expansion	France	2
159	Maastricht – Aachen – Heerlen – Lie`ge	merger	Netherlands	1
160	Madrid	expansion	Spain	1
161	Manchester	expansion	United Kingdom	1
162	Marseille	expansion	France	1
163	Marseille – Aix – en – Provence	merger	France	1
164	megaregion around Hangzhou Bay	new name	China	1
165	Messina – Reggio del Calabria	merger	Italy	1
166	metropolitan region of Athens	expansion	Greece	2
167	Metz – Nancy – Thionville – Hagondange	merger	France	1
168	Mexico City metropolitan area	expansion	Mexico	2
169	Midden – Brabant	new name	Netherlands	1
170	Middlesbrough	expansion	United Kingdom	1
171	Midland – Odessa	merger	United States	1
172	Milan	expansion	Italy	2
173	Milan and Turin	merger	Italy	1
174	Minneapolis – St Paul	merger	United States	2
175	Montpellier – Nîmes	merger	France	1
176	Montreal metropolitan region/Montreal region	expansion	Canada	2
177	Moscow	expansion	Russia	1
178	Mulhouse – Colmar – Belfort et villes frontalières (Mulhouse – Colmar – Belfort and border towns)	merger	France	1
179	Munich	expansion	Germany	4
180	Nanjing (part of Yangtze River Delta)	expansion	China	1
181	Naples	expansion	Italy	1
182	New York	expansion	United States	3
183	Newcastle	expansion	United Kingdom	1
184	Nice – Cote d’Azur – San Remo	merger	France/Italy	1
185	Nitra – Trnava	merger	Slovakia	1
186	Noord – Brabant (Eindhoven – Tilburg – Den Bosch – Breda)	new name	Netherlands	1
187	Noord – Kennemerland	new name	Netherlands	1
188	Noord – Limburg	new name	Netherlands	1
189	Noordoost – Brabant	new name	Netherlands	1
190	Nord – Pas – de – Calais	new name	France/Belgium	2
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	Region	Kind of name	Country	No. of mentionings in the literature
191	Nordrhein – Westfalen	new name	Germany/Netherlands	1
192	North West England and North Wales	new name	United Kingdom	1
193	Northampton	expansion	United Kingdom	1
194	Northeast	new name	United States	1
195	Northern Jiangxi	new name	China	2
196	Northern Ningxia	new name	China	2
197	northern Switzerland	new name	Switzerland	8
198	Norwich	expansion	United Kingdom	1
199	Norwich – Lowestoft	merger	United Kingdom	1
200	Nottingham	expansion	United Kingdom	1
201	Nottingham and Sheffield	merger	United Kingdom	1
202	Nottingham – Derby	merger	United Kingdom	1
203	Nuremberg	expansion	Germany	1
204	Olomouc – Zlin – Prerov – Prostějov	merger	Czech Republic	1
205	Oresund	new name	Denmark/Sweden	1
206	Orleans – Blois – Tours	merger	France	1
207	Osaka	expansion	Japan	1
208	Oviedo – Gijón – Aviles	merger	Spain	1
209	Padua	expansion	Italy	1
210	Padua – Treviso – Venice	merger	Italy	4
211	Paris/Paris region	expansion	France	16
212	Parma – Reggio Emilia – Sassuolo	merger	Italy	1
213	Pau – Tarbes – Lourdes	merger	France	1
214	Pau – Tarbes – Oloron – Sainte Marie	merger	France	1
215	Pearl River Delta	new name	China	8
216	Perugia	expansion	Italy	1
217	Philadelphia	expansion	United States	2
218	Philadelphia – Baltimore – Washington region	merger	United States	1
219	Phoenix/Phoenix metropolitan area	expansion	United States	3
220	Piedmont	new name	Italy	1
221	Piedmont Atlantic	new name	United States	1
222	Pittsburgh	expansion	United States	1
223	Płock – Włocławek	merger	Poland	1
224	Plovdiv – Pazardzhik – Asenovgrad	merger	Bulgaria	1
225	Plymouth	expansion	United Kingdom	1
226	Po valley	new name	Italy	1
227	Poitiers – Niort – La – Rochelle – Angoulême	merger	France	1
228	Portland	expansion	United States	4
229	Porto – Braga – Guimarães	merger	Portugal	1
230	Portsmouth	expansion	United Kingdom	1
231	Portsmouth – Southampton	merger	United Kingdom	1
232	Preston	expansion	United Kingdom	1
233	Quingdao – Jī'nán – Weihai	merger	China	1
234	Randstad/Dutch Randstad	new name	Netherlands	34
235	Ravensburg – Kempten	merger	Germany	1
236	Reading	expansion	United Kingdom	1
237	Reims – Troyes – Chalons-sur-Marne	merger	France	1
238	Research Triangle' of North Carolina	new name	United States	2
239	Rhein – Main	new name	Germany	1
240	Rhein – Neckar (Mannheim – Ludwigshafen – Heidelberg)	new name	Germany	1
241	Rhine – Ruhr	new name	Germany	11
242	Rome/metropolitan region of Rome	expansion	Italy	3
243	Salerno	expansion	Italy	1
244	Salt Lake City – Ogden – Clearfield	merger	United States	1
245	San Francisco	expansion	United States	4
246	San Francisco Bay area	new name	United States	4
247	San Jose – San Francisco – Oakland	merger	United States	1
248	Sankt Gallen – Bregenz	merger	Austria/Germany/Switzerland	1
249	Santa Barbara – Santa Maria	merger	United States	1
250	Sao Paulo	expansion	Brazil	1
251	Seattle	expansion	United States	1
252	Shandong Peninsula	new name	China	2
253	Shanghai	expansion	China	3
254	Shanghai – Suzhou – Nanjing – Hangzhou	merger	China	1
255	Sheffield	expansion	United Kingdom	2
256	Shenyang	expansion	China	2
257	Shenyang – Anshan – Dalian	merger	China	1
258	Sicily	new name	Italy	1
259	Silesian – Moravian	new name	Poland/Czech Republic	1
260	Sittard – Geleen	merger	Netherlands	1
261	south region; southern region (Geelen/Sittard, Heerlen, Maastricht)	new name	Netherlands/Belgium/Germany	1
262	Southampton	expansion	United Kingdom	1
263	South-East England (London is centered)	new name	United Kingdom	3
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	Region	Kind of name	Country	No. of mentionings in the literature
264	Southern California/southern Californian urban region	new name	United States	5
265	Southern Guangxi	new name	China	2
266	St. Louis	expansion	United States	2
267	Stavanger Metropolitan area	expansion	Norway	1
268	Stedendriehoek	new name	Netherlands	1
269	Stockholm – Uppsala	merger	Sweden	1
270	Stoke/Stoke-on-Trent	expansion	United Kingdom	1
271	Strasbourg – Baden – Offenburg – Haguenau	merger	Germany	1
272	Sydney, Greater Sydney urban region, Greater Sydney Region	expansion	Australia	1
273	Szeged – Mako – Szentes – Hodmezovasarhely	merger	Hungary	1
274	Tampere	expansion	Finland	1
275	Texas Urban Triangle	new name	United States	2
276	Thanet – Ashford – Canterbury – Dover	merger	United Kingdom	1
277	The Delta Metropolis	new name	Netherlands	1
278	The Great Lakes	new name	United States	1
279	The Katowice district/Katowice conurbation	expansion	Poland	2
280	The Medway Towns	new name	United Kingdom	1
281	The north and the east region (Leeuwarden, Groningen, Enschede)	new name	Netherlands	1
282	The Potteries	new name	United Kingdom	1
283	Tianshan Mountains	new name	China	2
284	Tokaido	new name	Japan	1
285	Tokyo Metropolitan Area	expansion	Japan	1
286	Tokyo – Yokohama	merger	Japan	1
287	Trento – Bolzano	merger	Italy	1
288	Turin	expansion	Italy	2
289	Turku	expansion	Finland	1
290	Twente	new name	Netherlands	1
291	Tyneside	new name	United Kingdom	1
292	Ulm – Aalen – Heidenheim	merger	Germany	1
293	Upper Silesian coal district around Katowice, Bytom, and Gliwice	new name	Poland	1
294	Utrecht	expansion	Netherlands	1
295	Valence – Privas – Romans – Montelimar	merger	France	1
296	Vannes – Lorient – Quimper – St Malo – St Brieuc	merger	France	1
297	Veneto	new name	Italy	1
298	Venezia – Padova	merger	Italy	1
299	Vigo – Pontevedra – Vilagarcia	merger	Spain	1
300	Wallonia	new name	Belgium	1
301	Washington/Greater Washington	expansion	United States	2
302	West – Brabant	new name	Netherlands	1
303	Westelijke Mijnstreek	new name	Netherlands	1
304	Westfriesland	new name	Netherlands	1
305	West-Kennemerland	new name	Netherlands	1
306	Yangtze River Delta	new name	China	7
307	Zilina – Martin	merger	Slovakia	1
308	Zuid-Holland Noord	new name	Netherlands	1
309	Zuid-Holland Oost	new name	Netherlands	1
310	Zuid-Holland Zuid	new name	Netherlands	1
311	Zuidoost-Brabant	new name	Netherlands	1
312	Zurich	expansion	Switzerland	1