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Understanding the role of centralization processes for cities – Evidence from a spatial perspective of urban Europe 1990–2010

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ABSTRACT

In the 21st century, the urban systems in most countries have undergone constant change, ranging between shrinkage, growth, and non-linear trajectories. All trends have an effect on the hinterland and are discussed in the context of agglomeration effects or hinterland shrinkage due to reurbanization. Thus, cities' population trajectories are not independent but rather is reinforced or runs contrary to the hinterland development.
In order to simultaneously capture trends in cities and their hinterlands, urban life-cycle models are used. Using a systematic differentiation between the trend in the core and the hinterland, it is possible to distinguish between a stronger population growth of core cities and a situation in which the hinterland is growing faster – labeled centralization and decentralization, respectively. Developed in the 1980s, the widely used model of van den Berg reveals, however, some major drawbacks.
Against this background, the paper will revisit van den Berg's et al. model and test it against the urban conditions in Europe between 1990 and 2010 by asking whether cities are decentralizing or centralizing and whether there are differences between growing and shrinking cities. The paper develops a city delineation, covering large and small cities, uses data about age structure, and applies an adapted model by measuring the intensity of the trends. The rapidly changing population trends since the beginning of the global economic crisis and its effects in Europe since 2008 require that more attention be paid to changing configurations between cities and processes beyond cities' borders, which is essential for both scholars and urban planners.

1. Introduction

In the 21st century, the urban systems in most countries have been subjected to constant change that ranges from shrinkage, through growth, to non-linear trajectories (Turok & Mykhnenko, 2007; Reckien & Martinez-Fernandez, 2011), accompanied by strong interrelationships with the cities' hinterland: Agglomeration effects lead to reinforced population growth in the hinterland, whereas the flight of people and jobs to the suburbs may lead to the decline of other core cities; some cities have even managed to regrow in parallel with population loss, deterioration and housing vacancies in their hinterland (Siedentop & Fina, 2008; Couch, Karecha, Nuissl, & Rink, 2005; Bier, 2001). Thus, cities' population trajectories are not independent but rather is reinforced or runs contrary to the hinterland development (Bento, Franco, & Kaffine, 2006; ESPON, 2014b).

Urban life-cycle models are used to simultaneously capture trends in cities and their hinterlands. By using a systematic differentiation between trends in the core and the hinterland, it is possible to distinguish between stronger population growth in cities' cores and a situation in which the hinterland is growing faster; these two trends are known as centralization and decentralization, respectively (Champion, 2001). Whereas, for Europe, some authors have identified a new centralization or recentralization (Cheshire, 1995; Kabisch & Haase, 2011), others predict that further population increase in cities will slow down, in favor of decentralization processes (Champion, 2001). Urban shrinkage[1] is thereby treated as an unavoidable consequence of decentralization and as a precondition for recentralization but it has been rarely asked whether shrinkage follows a centralization or decentralization trend.

By successively ordering these stages, van den Berg, Drewett, Klaassen, Rossi, and Vijverberg (1982) developed a cyclic model in which urbanization or centralization is followed by suburbanization, with decentralization tendencies, and, finally, ending in disurbanization, with population loss in cities and their hinterland. Reurbanization, treated by these authors as a fourth hypothetical stage, has been detected in other studies (e.g., Cheshire, 1995; Kabisch & Haase, 2011). Because trends such as urbanization or suburbanization are not treated separately, the model is widely used in order to describe the situations of urban systems. However, it also reveals some

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[1] We use the terms *shrinking urban area* and *shrinking* city interchangeably; *urban shrinkage* refers to the process measured by *population decline*.

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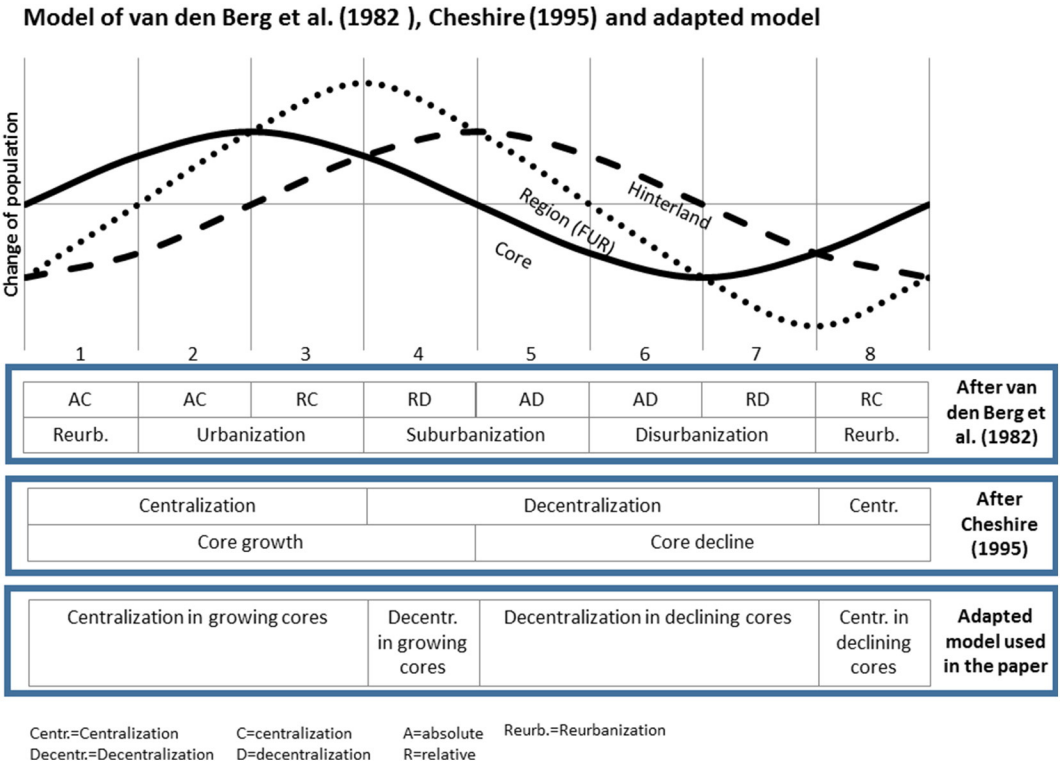

Fig. 1. Life-cycle models and adapted four-stage model.

drawbacks (for a broader discussion, see Antrop, 2004; Nyström, 1992; Parr, 2012). First, van den Berg et al. (1982) analyzed large cities with more than 200,000 inhabitants. Second, the use of population change as an indicator is criticized because it hides certain trends, such as shifts in the population structure. Third, the model captures the changes between stages insufficiently, because population trajectories do not follow the consecutive order of the model's stages.

Against this background, the paper will revisit van den Berg's et al. model and test it against the urban conditions in Europe between 1990 and 2010 by asking whether cities are decentralizing or centralizing and whether there are differences between growing and shrinking cities. In view of the mentioned drawbacks, the paper develops a city delineation covering large and small cities, uses data about age structure, and applies an adapted model by measuring the intensity of the trends. The rapidly changing population trends since the beginning of the global economic crisis and its effects in Europe since 2008 require that more attention be paid to changing configurations between cities and processes beyond cities' borders, which is essential for both scholars and urban planners. Thereby, the papers' objectives are to:

- detect how relevant the life-cycle model is in contemporary urban Europe and what stages are persistent/temporary,
- identify patterns of centralization and decentralization in order to enrich the life-cycle model, and
- discuss emerging policy lessons that can be derived from the results.

2. Methods

In order to distinguish between cores and hinterlands that form a Functional Urban Regions (FUR), functional approaches are used, which are, however, very heterogeneously defined among European countries (Brezzi, Piacentini, Rosina, & Sanchez-Serra, 2012). Existing databases for Europe also have some shortcomings.[2] Therefore, an alternative approach is developed that aims at defining 'potential' FURs that covers the entire territory and links each municipality in the hinterland to the core within its zone of influence, based on physical accessibility (Hall & Hay, 1980; ESPON, 2014b; Bretagnolle, Paulus, & Pumain, 2002). The core is defined by merging cities, as defined by Wolff and Wiechmann (forthcoming) and is based on a common built-up area, in order to better reflect the morphological character of a city and to increase comparability across Europe (Parr, 2012; Turok & Mykhnenko, 2007). Following the concept of time-budgets spent by commuters as a more stable parameter, compared to commuter flows, the hinterland is defined by merging municipalities that can be reached from the core within 45 min by car (Guérois, Bretagnolle, Mathian, & Pavard, 2014; Meijers, Burger, & Hoogerbrugge, 2015; Thinh & Vogel, 2006). This results in 5692 cores, for which we use the term urban areas interchangeably, and 2733 FURs (Fig. 5 in the Appendix).

In accordance with other studies, we use population for 1990, 2000 and 2010 in 36 European countries as a common indicator for urban development (Turok & Mykhnenko, 2007; Haase, Bernt, Grossmann, Mykhnenko, & Rink, 2013; Hall, 1971), whereas shrinking urban areas are defined by absolute population loss. In order to reflect changes of the population structure and to discuss possible future trends, we further analyzed shifts of age groups by calculating elderly, young, and dependency rates (Parr, 2012).

The van den Berg et al. (1982) model is applied by presenting numbers for the two decades 1990–2000 and 2000–2010 for countries and regions together. In order to better mirror changes between stages without assuming a consecutive order, we apply an adapted four-stage model that has the advantage that the stages fall symmetrically into core population growth and decline, as well as into centralization and decentralization (Hall, 1971; Cheshire, 1995; Fig. 1). Centralization is understood as a population increase that is faster in the core than in the hinterland, or a faster decline in the hinterland than in the core – decentralization reflects the opposite. For the four stages, the intensity of relative (de)centralization is measured (following Cheshire, 1995; Parr, 2012) and expressed as the difference between the percentage change in hinterland and core. The more positive this index, the faster

[2] The FUA-IGEAT and the Larger Urban Zones (LUZ), as part of the Urban Audit, cover large cities, but cross-country flows of commuters, with which the hinterland is defined, are not available, providing a relatively selective picture (ESPON, 2014a).

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